United States Patent [19]

Link

[11] **3,759,361**

[45] **Sept. 18, 1973**

[54] **CARRIAGE RETURN AND LINE SPACE MECHANISM**

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[22] Filed: **Nov. 2, 1970**

[21] Appl. No.: **86,235**

[30] **Foreign Application Priority Data**

Nov. 3, 1969 Germany ..... P 19 55 198.5

[52] **U.S. Cl.** **197/65**, 197/98, 197/120, 197/17

[51] **Int. Cl.** **B41j 19/68**

[58] **Field of Search** 197/17, 65, 66, 67, 197/68, 98, 114, 120

[56] **References Cited**

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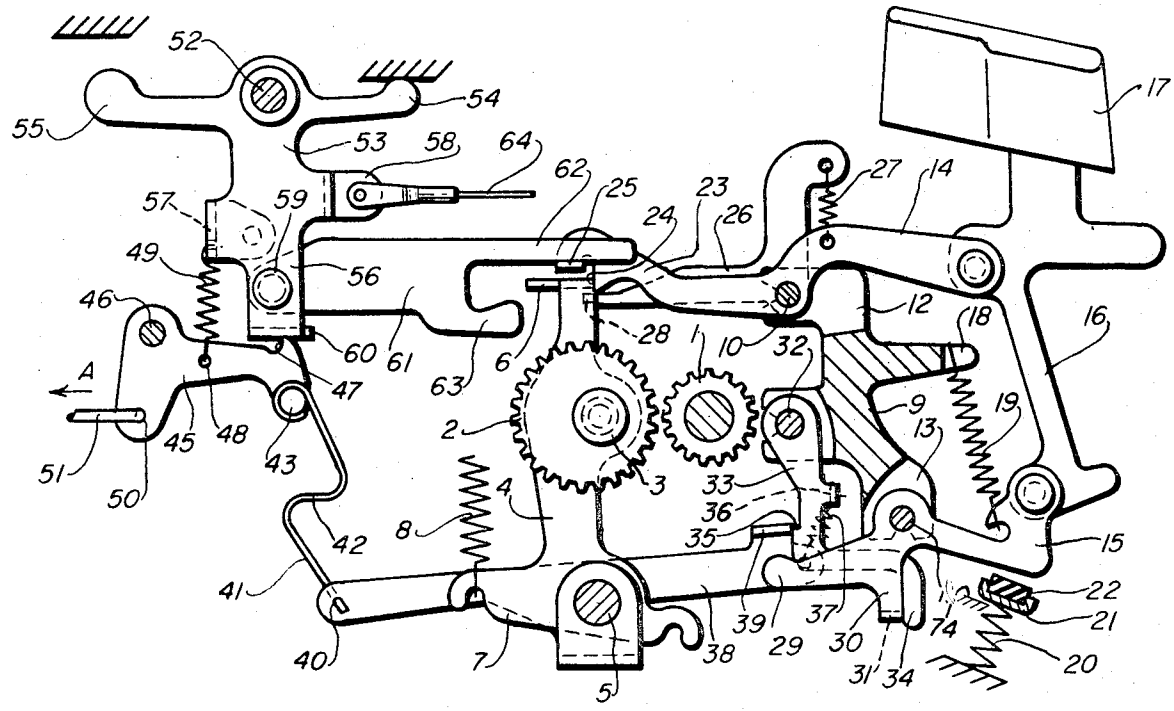
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[57] **ABSTRACT**

Mechanism to effect line spacing followed by carriage return movement via clutch and drawband in response to carriage return key depression is made conditionable upon carriage return key depression to a second limit to allow line spacing operation only and at any carriage position within set margins.

2 Claims, 4 Drawing Figures



Patented Sept. 18, 1973 3,759,361

2 Sheets-Sheet 1

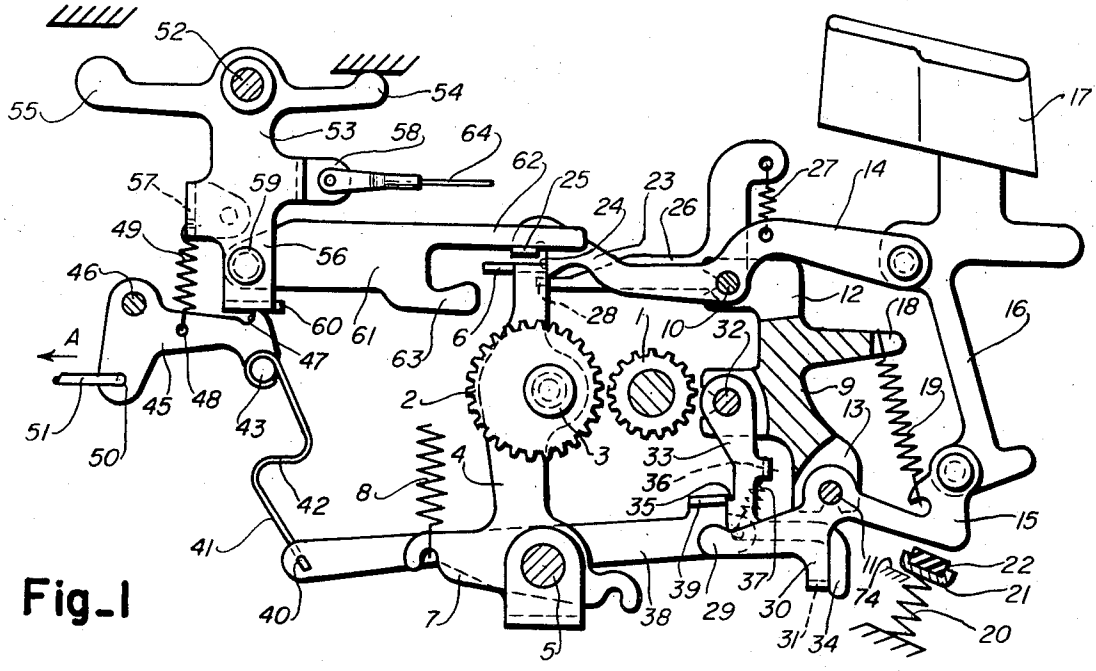


Fig_1

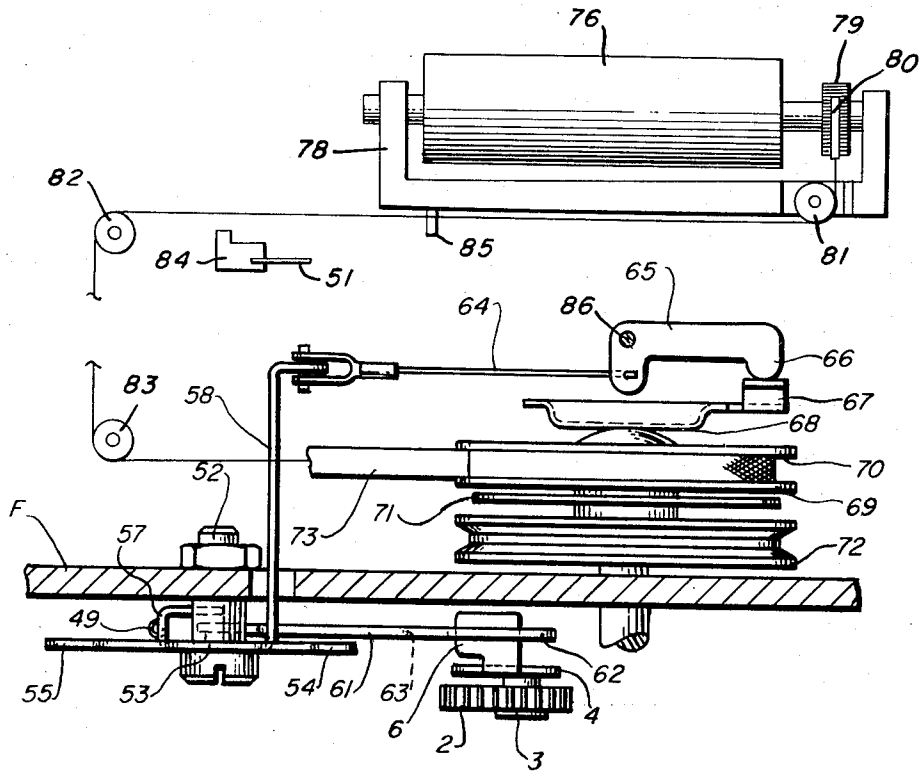


Fig_2

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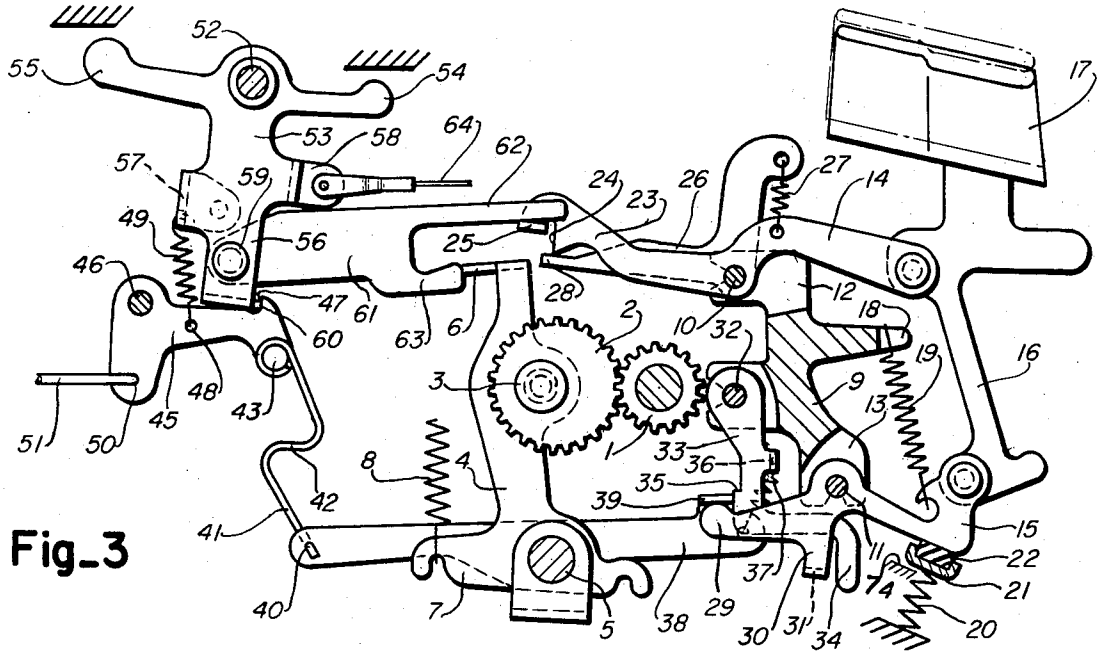


Fig_3

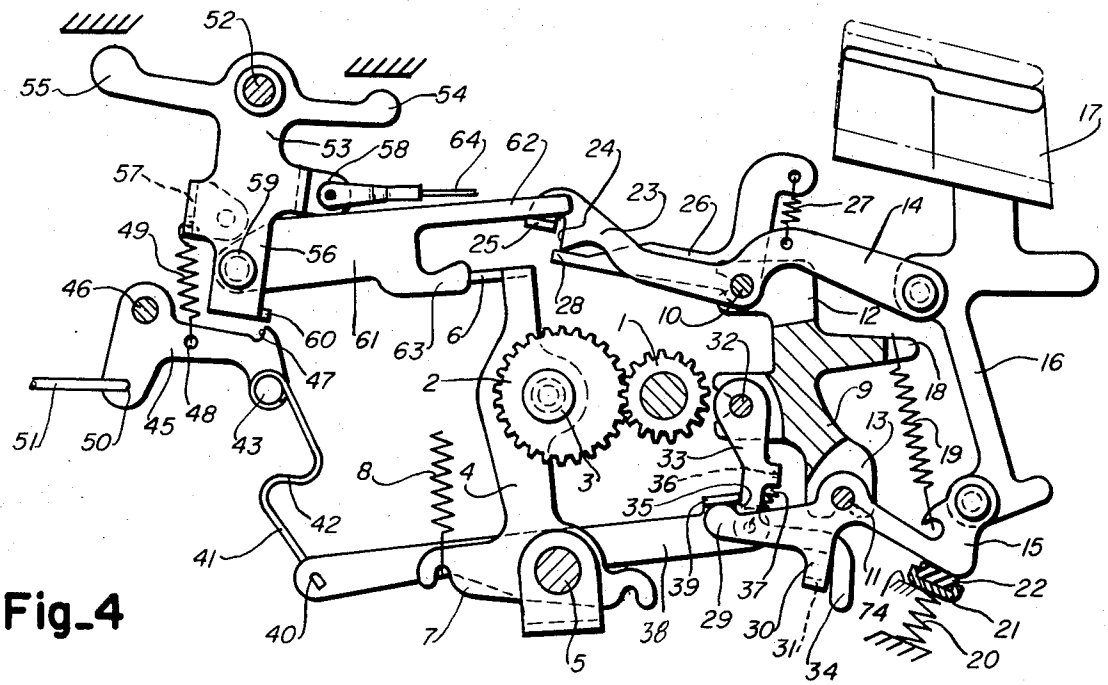


Fig_4

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CARRIAGE RETURN AND LINE SPACE MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to line space mechanism for typewriters or like machines; more particularly it relates to line space mechanisms operable incident to powered carriage return or operable at any carriage position without concomitant carriage movement, and specifically it relates to line space mechanism operable under control of a single double dip carriage return key.

A desiderata of machines operable to accomplish line space operation at any carriage position is to enable the calling of a line space and concomitant carriage return operation, or line spacing operation exclusively at any carriage position without the necessity of an operator having to move his hands from the home row as for instance, to reach a special key or the carriage itself.

The prior art has provided separate keys for effecting line spacing and carriage return, single keys for effecting both a line space function directly followed by carriage return movement, or the latter together with a special key for effecting line spacing at any carriage position without carriage movement.

Where special keys have been provided to effect line spacing at any carriage position, it has been necessary to provide a bail extending from end to end of a carriage and to provide a separate power source for rocking the bail so that the line space function can be controlled therefrom. This separate power source is in addition to the power source provided for returning the carriage. Thus, the use of a special key and concomitant parts increases machine complexity and cost.

SUMMARY OF THE INVENTION

In accordance with the invention, the carriage return key which serves to initiate a powered carriage return operation incident to which a line space operation first occurs, is conditionable on further carriage return key depression to effect powered line space operation, exclusive of carriage movement, at any carriage position.

This is accomplished by providing a lever which carries an eccentric cam which, when driven by a power roll, drives a carriage return clutch activating lever to couple power to wind a drawband on a drum. When the carriage return motion is desired, the cam driven clutch activating lever is latched in an active position until the carriage is returned to a left margin following line space operation by the drawband. When line spacing is desired exclusive of carriage movement, the latch provided to latch the carriage return clutch activating lever is disabled allowing the carriage return clutch to engage and disengage with the movement of the eccentric cam supporting lever for as long as the carriage return key is held depressed to a bottom limit.

DESCRIPTION OF DRAWING

FIG. 1 is an elevational view of the carriage return-line feed key and carriage return clutch activating and control members;

FIG. 2 is an elevational view of the carriage return clutch and drawband powered thereby;

FIG. 3 is an elevational view similar to FIG. 1 with the carriage return-line feed key depressed to a first limit to effect a line space and carriage return function; and

FIG. 4 is an elevational view similar to FIG. 1 with the carriage return-line feed key depressed to a second limit to effect line space function exclusive of carriage movement at any position of the carriage.

Referring now to the drawing wherein like reference numerals designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a continuously motor driven toothed power roll 1 which is rotatably supported in side frames F (FIG.2) of a typewriter. Operatively associated with the power roll 1 is a toothed cam 2 which is eccentrically mounted on a stud 3 which is attached to a drive lever 4 which can pivot or rock around an axle or fulcrum rod 5 so as to form an oscillatable mechanism. The upper part of the drive lever 4 is shaped as a bent extension 6. The drive lever 4 also has,adjacent to its lower end, an extension 7 to the end of which a frame anchored extension spring 8 is hooked to bias the lever 4 clockwise. Also mounted between the side frames F is a bracket 9 carrying an upper fulcrum rod 10 and a lower fulcrum rod 11 with slots 12 and 13 which guide in a well known manner all the connecting levers of the key levers as well as the connecting levers 14 and 15 of a carriage return key lever 16 which carries the return key 17. A carriage return key lever return spring 19 is secured to an upper extension 18 of the bracket 9 and to the lower connecting lever 15. A bail 21 supported on one or more springs 20 carries a contact 22 which is made from an elastic material positioned in the path of motion of the lower connecting lever 15. The rearwardly extending arm of the upper connecting lever 14 is shaped in the form of a stop 23 which has a contact point 24 and a bend 25. Adjacent to the upper connecting lever 14 within the slot 12 and rotatably mounted on the upper fulcrum rod 10 is a calling crank 26, the first rearward extending arm of which runs out as a stop surface 28 and the upward extending second arm of which is connected by a spring 27 to the forward extending arm of the upper connecting lever 14.

The lower connecting lever 15 has a rearward extending arm which terminates in a ball shaped finger 29 and also has a downward extension 30 terminating in a bent off ear 31. The bracket 9 also supports another fulcrum rod 32 intermediate fulcrum rods 10 and 11 which carries a pivotable locking lever 33. This lever 33 depends downwardly and extends forward and downward terminating in a finger 34. The lever 33 also has a locking edge or shoulder 35 which serves as a latching means for a crank 38 and a spring hole 36 which takes an extension spring 37. The other end of the extension spring 37 is hooked onto the forward end of the crank 38 which pivots on the fulcrum rod 5. Adjacent to the forward end of the crank 38 there is formed a bent off ear 39 positioned opposite the locking edge 35 of the lever 33. On the rearward end, the crank 38 has a hole 40 into which a link 41 is fitted. The link 41 has a bend 42 which allows a certain amount of spring. The other end of the link 41 is bent around a stud 43 and is thereby connected with a locking or latch lever 45. The locking lever 45 which serves as a carriage return latching means is mounted pivotally on another stud 46 and has a forward latching hooked extension 47 as well as a hole 48 to accept one end of a spring 49, and another hole 50 on a downward extension into which the link 51 is fitted. On a pivot stud 52 a multi-armed lever 53 is mounted. Laterally extending fingers with rounded terminations 54 and 55

determine its end positions. In FIG. 1 the arm 56 of lever 53 which extends downward includes a lateral bent off ear 57 onto which the spring 49 is fitted. The multi-armed lever 53 also has a forward extending side arm 58, and the end of the downward extension has a bent off ear 60. A rivet 59 on the arm 56 pivotally mounts an intermediate lever 61 having a forward extending upper finger 62 and a shorter lower finger 63. The side arm 58 of lever 53 (FIG. 2) is connected by a link 64 to a crank 65 which has an arm with a rounded end 66 in contact with a carriage return clutch lever 67 the multi-armed lever 53, the clutch lever 67, the link 64 and the crank 65 all serve to form clutch control means for controlling the application of power to the drawband reel or barrel 70. The clutch lever 67 is pivotally mounted in the machine and has a protruding surface 68 in contact with the clutch disk 69 which also constitutes part of the drawband barrel 70 which is adapted, through a friction disk 71, to be connected with a motor driven pulley 72, which is connected in a well known way (not shown) via gears, belts, or the like with a constantly rotating driving motor. On the drawband barrel 70 the drawband 73 is secured and wound. The drawband 73 is drawn around a series of pulleys 81, 82, 83, and the other end of the drawband 73 is attached to a line space pawl 80 mounted on the typewriter carriage 78 and through which the carriage 78 is returned following line spacing or indexing.

The two functions, carriage return with platen indexing, or platen indexing only, are achieved in accordance with the invention by different modes of operation as follows:

On depressing the key 17 the key lever 16 moves down until it touches the contact 22 (FIG. 3) causing the upper connecting lever 14 and the lower connecting lever 15 to pivot around the fulcrum rods 10 and 11. The contact point 24 on the stop 23 thereby moves from the path of the drive lever 4 which, spring loaded by spring 8, moves the cam 2 into engagement with the toothed power roll 1. At the same time the bend 25 of the stop 23 lifts and turns the intermediate lever 61 around the rivet 59 so that the short finger 63 enters into the path of motion of the extension 6 of the lever 4. When the constantly rotating power roll 1 starts turning the cam 2, the drive lever 4 is caused to pivot around the fulcrum rod 5, counterclockwise. This via intermediate lever 61 causes the multi-armed lever 53 to rotate clockwise and to be latched by the extension 47 of lever 45 which serves as a carriage return latching means. The motion of the multi-armed lever 53 is transmitted through the side arm 58 to the link 64 and from there to the crank 65 (FIG. 2). The crank 65 is pivoted absent a pivot 86 has a ball shaped arm 66 which transmits the motion of the crank 65 to the clutch lever 67. The tilting of the clutch lever 67 causes pressure on the clutch disc 69 and on the friction disk 71 which winds up the drawband 73. Through the motion of the drawband 73, the line space pawl 80 is caused to rotate a ratchet 79 index the platen 76 by an initial winding of the drawband 73 after which the carriage is brought back into its original position by an additional continued winding of the drawband 73 in the well known way till a projection 85 on the carriage 78 hits the left margin stop 84, shown diagrammatically in FIG. 2. The left margin stop 84 is connected with a link 51 which is hooked onto the locking lever 45. If now the carriage 78 has reached its final left position, the link 51 is moved in the direction of the arrow A (FIG. 1) causing the locking lever 45 to turn clockwise around the stud 46, releasing the multi-armed lever 53 latched by engagement of its bent off ear 60 by the extension 47. In this manner, the pressure caused by the clutch lever 67 on the friction disk 71 is released and the drawband barrel 70 comes to a standstill. This finishes the platen indexing and the carriage return motion, which was caused by the drawband 73.

If the key 17 remains depressed to the limit as shown in FIG. 3 without compressing the additional spring 20, the contact point 24 would be outside the area of motion of the drive lever 4. Under this condition, the drive lever 4 would fall back into its original position, in which case the cam 2 would re-engage the power roll 1. This falling back is successfully avoided by the calling crank 26 which, when the key 17 (FIG. 3) is depressed, is pulled or moved up so high by the spring 27 that the stop surface 28 interferes with the return of the drive lever 4.

In order to perform a platen indexing exclusively at any carriage position between margins, it is necessary to depress the key 17 to a second limit which is (FIG. 4) until the lower connecting lever 15 moves the contact 22 which is mounted on the bail 21 to press it against a fixed stop 74 thereby overcoming the resistance of the additional spring 20. With this, the stop 23 is moved so that its contact point 24 moves from the path of and releases the drive lever 4, stop surface 28 moves out of the return path of drive lever 4, and the short finger 63 of the intermediate lever 61 rocked by the bend 25 moves within the area of motion of the extension 6 of the drive lever 4. The additional depression of key 17 against the force of the additional spring 20 causes the lower connecting lever 15, via its ball shaped finger 29, to move the crank 38 counterclockwise about axle 5 until the bent off ear 39, under the influence of the extension spring 37, latches with the locking lever 33 at the locking edge 35. Rotation and latching of the crank 38 which serves as a carriage return disabling means in turn causes rotation of the locking lever 45 which is connected to the crank 38 by the link 41. The rotation of the locking lever 45 moves its hooked extension 47 outside the area of motion of the bent off ear 60 on the multi-armed lever 53. If now the cam 2 which is mounted on the drive lever 4 contacts the power roll 1, the extension 6 drives the intermediate lever 61 and rocks the multi-armed lever 53 clockwise.

As already described with the function of cylinder indexing and carriage return with respect to FIG. 3, the drawband barrel 70 becomes clutched to the drive wheel 72 through the clutch lever 67 causing the drawband 73 to be wound up. The drawband barrel 70 remains connected to the drive wheel 72 until, because of the shape of the cam 2, the intermediate lever 61 is no longer driven permitting the multi-armed lever 53 to move counterclockwise. The counterclockwise motion of the multi-armed lever 53 is under the influence of the spring 49 and is made possible by the fact that the locking lever 45 through the crank 38 is held in its lower position outside the area of motion of and does not latch the multi-armed lever 53. As long as the key lever 17 is held depressed to the position shown in FIG. 4, the back and forth oscillating motion of the multi-armed lever 53 will repeat itself and therefore the clutching in and clutching out of the drawband barrel

70 with the drive wheel 72. The duration of the clutching is determined by the shape of the cam 2 in such a way, that the drawband 73 always moves equally to the maximum motion required for the line spacing of the platen 76. After releasing the key 17 the key lever 16 is returned to its rest position under the influence of the additional spring 20 and the extension spring 19. The ball shaped finger 29 on the lower connecting lever 15 moves away from the crank 38 and the locking lever 33 is rotated counterclockwise by the bent over ear 31 on the extension 30 of lever 15 acting on the finger 34 of locking lever 33 with the result that the locking edge 35 on the locking lever 33 releases the bent off ear 39 of the crank 38. The spring 49 can now again bring the locking lever 45 against the bent off ear 60 of the multi-armed lever 53 causing the device to assume the original position as shown in FIG. 1. Accordingly, from the FIG. 1 position, it is possible, depending on how far the key 17 is depressed, to the position shown in FIG. 3 or FIG. 4, respectively, to get either a line spacing with carriage return or exclusively a single or multiple line spacing.

If the key 17 remains constantly depressed as shown in the position in FIG. 4 then the stop surface 28 of the lever 26, following the upper connecting lever 14, via the spring 27, will be moved out of the path of the drive lever 4 permitting its cam 2 to engage the power roll 1 again and again for additional cycles of exclusively line spacing.

From the description of the device, according to the invention it can be seen that it is possible without great expenditure to arrange to call from the carriage return key 17 the function of line spacing with carriage return, or exclusively line spacing at any position of the carriage 78. To call the carriage return clutch, only a cam 2 driven by the constantly rotating power roll 1 is used and no additional elements on the moving carriage 78 are required which would stretch along the whole length of it. The mass of the carriage 78, which has a considerable influence on the typing speed and the quality of the typewriter, is, in this way, not increased.

The invention claimed is:

1. In a business machine having a paper platen line indexable by the initial winding of a drawband by a power driven reel and a carriage returnable to a left margin position by additional continued winding of the drawband by the power driven reel, the improvement comprising:

a carriage return key depressible to initiate the line indexing and carriage return functions of the business machine,

an oscillatable mechanism operable in response to the depression of said carriage return key for undergoing repeated cyclical movements with the carriage at any position along a line of type,

clutch control means connected in power controlling relation with said power driven reel for controlling the winding of said drawband by said powered reel to effect the line indexing and carriage return functions of the business machine at any position of the carriage along a line of type,

said clutch control means being operable in response to the cyclical movement of said oscillatable mechanism at any position of the carriage along a line of type including positions removed from the left margin for imparting cyclically repeated initial winding movements to said drawband by said power driven reel to effect repeated line indexing of the paper platen without the continued additional winding necessary for returning the carriage to the left margin position,

said carriage return key being depressible to a first position for initiating both line indexing and carriage return functions and being further depressible to a second position for initiating only the line indexing function at any position of the carriage along a line of type,

carriage return latch means normally operable in response to the depression of said carriage return key to the first position for maintaining said clutch control means in the operated condition for imparting continued additional winding movement to said drawband to effect return of the carriage to the left margin position, and

carriage return disable means operable in response to the further depression of said carriage return key to the second position for disabling said carriage return latch means to enable the operation of said clutch control means to effect repeated initial winding of said drawband by said power driven reel for causing repeated line indexing of the paper platen.

2. In a business machine according to claim 1, the combination further comprising another latch means operable in response to the depression of said carriage return key to the second position for maintaining disabled said carriage return latch means so long as the carriage return key remains depressed to the second position by maintaining said carriage return disable means in an operated condition.

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