

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO TYPEWRITERS

(71) We, SCM CORPORATION, a corporation organised under the laws of the State of New York, United States of America of 299 Park Avenue, New York, New York 10017, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to typewriters and more particularly to a keylever touch control mechanism for selectively varying the force required to depress a keylever.

According to the invention there is provided a typewriter having a frame, a plurality of keylevers supported on the frame for movement relative thereto, a plurality of leaf springs underlying and biasing the keylevers upwardly, and a keylever touch control mechanism supported on the frame, comprising:

control means for selectively positionable relative to the frame;

holding means for holding the control means in each of the selected positions;

a shiftable bail supported on the frame and moveable by said control means between an inoperative position and an operative position, the shiftable bail in the operative position being spaced from the keylever leaf springs to avoid affecting the touch of the keylevers and in the operative position being disposed in contact with said leaf springs; and

a touch control spring connected to the shiftable bail to cause the bail to add to the upward bias of the leaf springs to effect a heavier touch on the keylevers when the shiftable bail is in the operative position.

Hereinafter described is a preferred embodiment of the invention wherein the keylevers of a typewriter are supported on a

common pivot and are of different lengths for each row. The touch control mechanism includes a flat flexible spring that extends transverse the typewriter. One edge of the spring is mounted on the keylever segment and the other edge is slotted to define multiple leaf springs of various widths. The leaf springs underlie projecting abutments of each keylever to support and restore the individual keylevers to their rest position.

A spring loaded pivotal bail having individual rigid extensions underlying the individual leaf springs may be pivoted into or out of abutment with the leaf springs. A control mechanism includes a control lever pivotally supported on a frame and engageable by a detent mechanism to maintain the control mechanism in any one of two selected positions. The control mechanism is coupled to the bail to pivot the bail into and out of abutment with the leaf springs in response to the selected position of the control lever.

When the control lever is positioned to pivot the bail extensions out of abutment from the leaf springs, the keylever touch is then determined by the amount of force required to depress a keylever against and to deflect a corresponding leaf spring. This amount of force is minimal and is substantially the same among the keylevers in each row due to the various widths of the leaf springs which compensates for the different length keylevers.

When the control lever is positioned to pivot the bail extensions into abutment with the leaf springs, the amount of force required to overcome the normal spring tension of the leaf springs and the spring loaded bail is maximum and the keylever touch is increased.

The individual rigid extensions of the bail are of different lengths for engaging the leaf springs different distances relative

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to the ends of the leaf springs. The different length rigid extensions pivot the spring loaded bail a different amount for each row of keylevers to substantially equalize the keylever touch for all rows in the maximum touch condition.

Features and advantages of the invention will become more apparent from the following description of a preferred embodiment of the invention which is illustrated in the accompanying drawings in which:

Figure 1 is a left side elevation view of a typewriter incorporating a keylever touch control mechanism embodying the present invention;

Figure 2 is a perspective view of the control mechanism of the typewriter of Figure 1;

Figure 3 is a plan view showing several keylevers and their relationship with the leaf springs;

Figure 4 is a sectional side elevation view showing the keylever of row 1 in a rest and depressed position and its relationship with the touch control mechanism which is ineffective due to there being no underlying rigid extensions in alignment with the first row of keylevers;

Figure 5 is a sectional side elevation view showing the keylever of row 2 in a rest and depressed position and its relationship with the touch control mechanism in the effective position;

Figure 6 is a sectional side elevation view showing the keylever of row 3 in a rest and depressed position and its relationship with the touch control mechanism in the effective position;

Figure 7 is a sectional side elevation view showing the keylever of row 4 in a rest and depressed position and its relationship with the touch control mechanism in the effective position.

Referring now to Figure 1, a portion of a typewriter is shown having a pair of side frames 10 supported on a base 11. Spanning side frames 10, a keylever segment 12 provides the support for a plurality of keylevers 14, 15, 16 and 17 at a common pivot 28. When depressed, keylevers 14, 15, 16, and 17 engage a pivotal pawl 18 that pivots into the path of a rotating power roll 19. An actuator 20 that supports pawl 18 is urged to pivot and pull a connecting link 22 forward to place a typebar 24 in flight with sufficient momentum to strike a platen 26 with sufficient force to imprint a character on a printing medium placed therebetween.

Keylevers 14, 15, 16, and 17 are pivotally supported at one end on common pivot 28 that is supported by keylever segment 12. The keylevers are limited in their upward movement by a keylever extension

32 abutting an up-stop 33 and in their downward movement by an extension abutting a down stop 34. The other ends of keylevers 14, 15, 16, and 17 terminate in four forward extensions 21, 23, 25, and 27 respectively of different lengths to define four rows of keylevers.

To restore the keylevers to their rest positions and equalize the different mechanical advantage of the different length keylevers a flat spring 30 is utilized. Flat spring 30 underlies keylevers 14, 15, 16, and 17. Spring 30 is of single piece construction having one side fixed along the length of keylever segment 12 and the other side slotted towards the fixed side to define a series of different width leaf springs 36, 38, 40, and 42. Leaf springs 36, 38, 40, and 42 underlie and abut an abutment 44 of keylevers 14, 15, 16, and 17 to support the keylevers in their rest position and to restore the keylevers to rest position when they are depressed during operation. Leaf springs 36, 38, 40, and 42 underlie keylevers 14, 15, 16, and 17 in relation to the length of the keylevers. For example, the widest leaf springs 36 having the greatest bias tension underlie keylevers 14 that have the longest forward extensions and greatest mechanical advantage, best shown in Figures 3 and 7. The next widest leaf springs 38 having less tension underlie keylevers 15 that have shorter forward extension than keylevers 14 and less mechanical advantage, best shown in Figures 3 and 6. The next widest leaf springs 40 having still less bias tension underlie keylevers 16 that have shorter forward extensions than keylevers 15 and still less mechanical advantage, best shown in Figures 3 and 5. The narrowest leaf springs 42 capable of exerting the least bias tension underlie keylevers 17 that have the shortest forward extensions and the least mechanical advantage, best shown in Figures 3 and 4. Therefore, the amount of force required to depress keylevers 14, 15, 16, and 17 is substantially equalized as a result of the proper selection and relationship of springs 36, 38, 40, and 42 to keylevers 14, 15, 16, and 17.

The amount of force required to depress any keylever against a corresponding leaf spring is directly proportional to the length of the keylever measured from pivot 28 to the end of the keylever. In other words, the mechanical advantage of keylever 17, the shortest keylever, is less than the mechanical advantage of keylever 14, the longest keylever.

A bail 46 is pivotally supported about a fulcrum 48 formed on and extending along the length of keylever segment 12. Bail 46 is an elongated member having its ends 50 formed to cooperate with fulcrum 48 of

with bail extensions 52 that have the least mechanical advantage thereby effecting a necessary increase in force required to pivot bail 46 when depressing a keylever in the fourth row. As shown in Figure 6, leaf springs 38 of the third row cooperate with bail extensions 53. Bail extensions 53 have a greater mechanical advantage than bail extensions 52 thereby requiring a necessary force to depress a keylever in the third row that is substantially equal to the force required to depress a keylever in the fourth row. As shown in Figure 5, leaf springs 40 of the second row cooperate with bail extensions 54. Bail extensions 54 have a greater mechanical advantage than bail extensions 53 thereby requiring a necessary force to depress a keylever in the second row that is substantially equal to the force required to depress a keylever in the third row.

There has thus been described a simple and inexpensive control mechanism which provides for a variable keylever spring force to be exerted between the different rows of keylevers to offset the different lengths of keylevers in the different rows. Furthermore, the mechanism provides for the engagement of an additional spring system to provide maximum force to depress a keylever and the disengagement of the additional spring system to necessitate minimum force to depress a keylever.

While the foregoing description has shown and described the fundamental novel features as applied to a preferred embodiment, it will be understood by those skilled in the art that modifications embodied in various forms may be made without departing from the scope of the invention as defined in the following claims.

WHAT WE CLAIM IS:—

1. A typewriter having a frame, a plurality of keylevers supported on the frame for movement relative thereto, a plurality of leaf springs underlying and biasing the keylevers upwardly, and a keylever touch control mechanism supported on the frame, comprising:

control means selectively positionable relative to the frame;

holding means for holding the control means in each of the selected positions;

a shiftable bail supported on the frame and moveable by said control means between an inoperative position and an operative position, the shiftable bail in the inoperative position being spaced from the keylever leaf springs to avoid affecting the touch of the keylevers and in the operative position being disposed in contact with said leaf springs; and

a touch control spring connected to the shiftable bail to cause the bail to add to the upward bias of the leaf springs to ef-

fect a heavier touch on the keylevers when the shiftable bail is in the operative position.

2. A typewriter as defined in claim 1, wherein said shiftable bail includes extensions extending therefrom and underlying said keylever leaf springs for abutting the keylever leaf spring when said shiftable bail is in the operative position thereby affecting the touch of the keylevers.

3. A typewriter as defined in claim 2, wherein said shiftable bail extensions are of different lengths for contacting the keylever leaf springs at different predetermined points along said keylever leaf springs for equalizing the keylever touch of the different rows.

4. A typewriter as defined in claim 3, wherein a keylever leaf spring for a keylever in a first row of keylevers engages an extension of said shiftable bail at a first point along said keylever leaf spring when said shiftable bail is in said operative position and said shiftable bail includes a pivot means spaced from said first point and said shiftable bail actuates said touch control spring to provide a predetermined force required to depress a keylever in said first row of keylevers.

5. A typewriter as defined in claim 4, wherein a second keylever leaf spring for a keylever in a second row of keylevers longer than said first row of keylevers engages a second extension of said shiftable bail at a second point along said second keylever leaf spring and wherein said second point is spaced nearer said shiftable bail pivot means than said first point to provide a predetermined force required to depress a keylever in said second row of longer keylevers that is substantially equal to said predetermined force required to depress a keylever in said first row of shorter keylevers.

6. A typewriter as defined in claim 5 wherein a third keylever leaf spring for a keylever in a third row of keylevers longer than said second row of keylevers engages a third extension of said shiftable bail at a third point along said keylever leaf spring wherein said third point is spaced nearer said shiftable bail pivot means than said second point to provide a predetermined force required to depress a keylever in said third row of longer keylevers that is substantially equal to said predetermined force required to depress a keylever in said second row of shorter keylevers.

7. A typewriter as defined in any of the preceding claims wherein said touch control spring cooperates with said control means for biasing said shiftable bail to said operative position.

8. A typewriter as defined in any of the preceding claims wherein said holding

with bail extensions 52 that have the least mechanical advantage thereby effecting a necessary increase in force required to pivot bail 46 when depressing a keylever in the fourth row. As shown in Figure 6, leaf springs 38 of the third row cooperate with bail extensions 53. Bail extensions 53 have a greater mechanical advantage than bail extensions 52 thereby requiring a necessary force to depress a keylever in the third row that is substantially equal to the force required to depress a keylever in the fourth row. As shown in Figure 5, leaf springs 40 of the second row cooperate with bail extensions 54. Bail extensions 54 have a greater mechanical advantage than bail extensions 53 thereby requiring a necessary force to depress a keylever in the second row that is substantially equal to the force required to depress a keylever in the third row.

There has thus been described a simple and inexpensive control mechanism which provides for a variable keylever spring force to be exerted between the different rows of keylevers to offset the different lengths of keylevers in the different rows. Furthermore, the mechanism provides for the engagement of an additional spring system to provide maximum force to depress a keylever and the disengagement of the additional spring system to necessitate minimum force to depress a keylever.

While the foregoing description has shown and described the fundamental novel features as applied to a preferred embodiment, it will be understood by those skilled in the art that modifications embodied in various forms may be made without departing from the scope of the invention as defined in the following claims.

WHAT WE CLAIM IS:—

1. A typewriter having a frame, a plurality of keylevers supported on the frame for movement relative thereto, a plurality of leaf springs underlying and biasing the keylevers upwardly, and a keylever touch control mechanism supported on the frame, comprising:

control means selectively positionable relative to the frame;

holding means for holding the control means in each of the selected positions;

a shiftable bail supported on the frame and moveable by said control means between an inoperative position and an operative position, the shiftable bail in the inoperative position being spaced from the keylever leaf springs to avoid affecting the touch of the keylevers and in the operative position being disposed in contact with said leaf springs; and

a touch control spring connected to the shiftable bail to cause the bail to add to the upward bias of the leaf springs to ef-

fect a heavier touch on the keylevers when the shiftable bail is in the operative position.

2. A typewriter as defined in claim 1, wherein said shiftable bail includes extensions extending therefrom and underlying said keylever leaf springs for abutting the keylever leaf spring when said shiftable bail is in the operative position thereby affecting the touch of the keylevers.

3. A typewriter as defined in claim 2, wherein said shiftable bail extensions are of different lengths for contacting the keylever leaf springs at different predetermined points along said keylever leaf springs for equalizing the keylever touch of the different rows.

4. A typewriter as defined in claim 3, wherein a keylever leaf spring for a keylever in a first row of keylevers engages an extension of said shiftable bail at a first point along said keylever leaf spring when said shiftable bail is in said operative position and said shiftable bail includes a pivot means spaced from said first point and said shiftable bail actuates said touch control spring to provide a predetermined force required to depress a keylever in said first row of keylevers.

5. A typewriter as defined in claim 4, wherein a second keylever leaf spring for a keylever in a second row of keylevers longer than said first row of keylevers engages a second extension of said shiftable bail at a second point along said second keylever leaf spring and wherein said second point is spaced nearer said shiftable bail pivot means than said first point to provide a predetermined force required to depress a keylever in said second row of longer keylevers that is substantially equal to said predetermined force required to depress a keylever in said first row of shorter keylevers.

6. A typewriter as defined in claim 5 wherein a third keylever leaf spring for a keylever in a third row of keylevers longer than said second row of keylevers engages a third extension of said shiftable bail at a third point along said keylever leaf spring wherein said third point is spaced nearer said shiftable bail pivot means than said second point to provide a predetermined force required to depress a keylever in said third row of longer keylevers that is substantially equal to said predetermined force required to depress a keylever in said second row of shorter keylevers.

7. A typewriter as defined in any of the preceding claims wherein said touch control spring cooperates with said control means for biasing said shiftable bail to said operative position.

8. A typewriter as defined in any of the preceding claims wherein said holding



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keylever segment 12, best shown in Figure 2. A retainer 51 overlies bail ends 50 and maintains the cooperation between bail 46 and fulcrum 48. Spaced along the length of one edge of bail 46 are a series of extensions 52, 53, and 54 that terminate in upstanding tabs 55, 56, and 57. Extensions 52, 53, and 54 are of different lengths and extension tabs 55, 56, and 57 are in vertical alignment for engagement with the lever surface of leaf springs 36, 38, and 40 when bail 46 is in an effective operative position. For example, tab 55 of the shortest extension 52 is in alignment with the widest leaf spring 36 and shown in Figure 7. Tab 56 of intermediate length extension 53 is in alignment with the next widest spring 38 as shown in Figure 6. Tab 57 of the longest extension 54 is in alignment with the next widest leaf spring 40 as shown in Figure 5. The narrowest leaf spring 42 as shown in Figure 4 does not cooperate with any extension of bail 12 and hence, is not affected by the additional spring system of the touch control mechanism. An upstanding arm 58 on one end of bail 46 as shown in Figure 2 carries the free end of a spring 60 so as to bias bail 46 and therefore upstanding tabs 55, 56, and 57 into an abutting relationship with leaf springs 36, 38, and 40 when bail 46 is in its operative position. A rod link 62 extending from an arm 74 of a control mechanism 64 engages bail arm 58 to detain bail 46 in an inoperative position. Rod link 62 is formed to include an inclined abutment 63 which is positioned adjacent to and behind bail arm 58. Therefore, forward movement of arm 74 will result in a corresponding movement of rod link 62 to overcome the bias effect of spring 60 on bail 46. Inclined abutment 63 will simultaneously engage arm 58 and urge it forward to place bail 46 in an inoperative position.

Control mechanism 64, best shown in Figure 2, selectively controls the positioning of bail 46 and includes a horizontal platform 66, a control lever 68 and a detent member 70. Platform 66 is fixed to end frame 10 and provides support for control mechanism 64.

Control lever 68 is pivotally supported about a pivot stud 67 located on platform 66 and includes a pair of angularly disposed horizontal arms 72 and 74 that are fixed relative to one another. Arm 72 extends forward and arm 74 extends laterally and includes an upstanding detent pin member 75 projecting therefrom.

Detent member 70 is pivotally supported on platform 66 at one end 71 about a pivot stud 76. Spring 78 extends and is fixed between an opposite end 80 of detent member 70 and an ear 69 of platform 66

serves to bias detent member 70 in a counterclockwise direction. Detent member 70 extends above and crosswise of arm 74 of control lever 68 whereby either holding recess 82 or 84 formed in the edge face of detent member 70 is biased into selective retaining engagement with upstanding detent pin member 75 of control lever 68.

In operation, the touch control mechanism is normally disposed in an ineffective position to produce a minimum key touch. An ineffective position of the touch control mechanism prevails when control lever 68 is pivotally positioned clockwise by manually moving lever 72 laterally to the left until upstanding member detent pin 75 is engaged in holding recess 82 of detent member 70. Control lever arm 74 is now at its most forward position and link 62 is urged forward which, in turn, urges bail 46 to pivot downward thereby positioning bail extensions 52, 53, and 54 away from leaf springs 36, 38, and 40.

If a keylever 14, 15, 16 or 17 is now depressed, the force required to depress the keylever is a minimal force required to overcome only the spring tension of the opposed leaf springs 36, 38, 40, and 42.

If an operatively effective position of the touch control mechanism is desired, control lever 68 is pivotally positioned counterclockwise by manually moving lever 72 laterally to the right until upstanding detent pin member 75 is engaged in holding recess 84 of detent member 70. Control lever arm 74 is now at its most rearward position and rod link 62 is carried rearward, thus allowing spring 60 to urge bail 46 to pivot upward, thereby positioning bail extension 52, 53, and 54 in abutment with leaf springs 36, 38, and 40.

If a keylever 14, 15, and 16 is now depressed, the force required to depress the keylever is increased. When keylever 14, 15, or 16 is now depressed, the force required to depress the keylever must be increased to overcome the combination of the spring tension of leaf springs 36, 38, and 40, and the spring bias of bail spring 60 which maintains the abutting relationship of extension tabs 55, 56, and 57 with leaf springs 36, 38, and 40.

Moreover, the amount of force required to overcome the biasing effect of bail spring 60 is directed about fulcrum 48 and is predicated by the distance from bail fulcrum 48 to the predetermined point at which a bail tab abuts a leaf spring or what hereafter will be referred to as the mechanical advantage of bail extension. The greater the mechanical advantage of bail extension then less force is required to pivot bail 46.

More specifically, as shown in Figure 7, leaf springs 36 of the fourth row cooperate



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means includes a spring for biasing said holding means into engagement with said control means.

9. A typewriter incorporating a key-
5 lever touch control mechanism substantially as herein described with reference to the accompanying drawings.

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