Nov. 24, 1953 C. H. KENNEDY, JR 2,660,285

TYPEWRITER KEY TOUCH CONTROLLING MEANS

Filed April 24, 1951 2 Sheets-Sheet 1

FIG-1

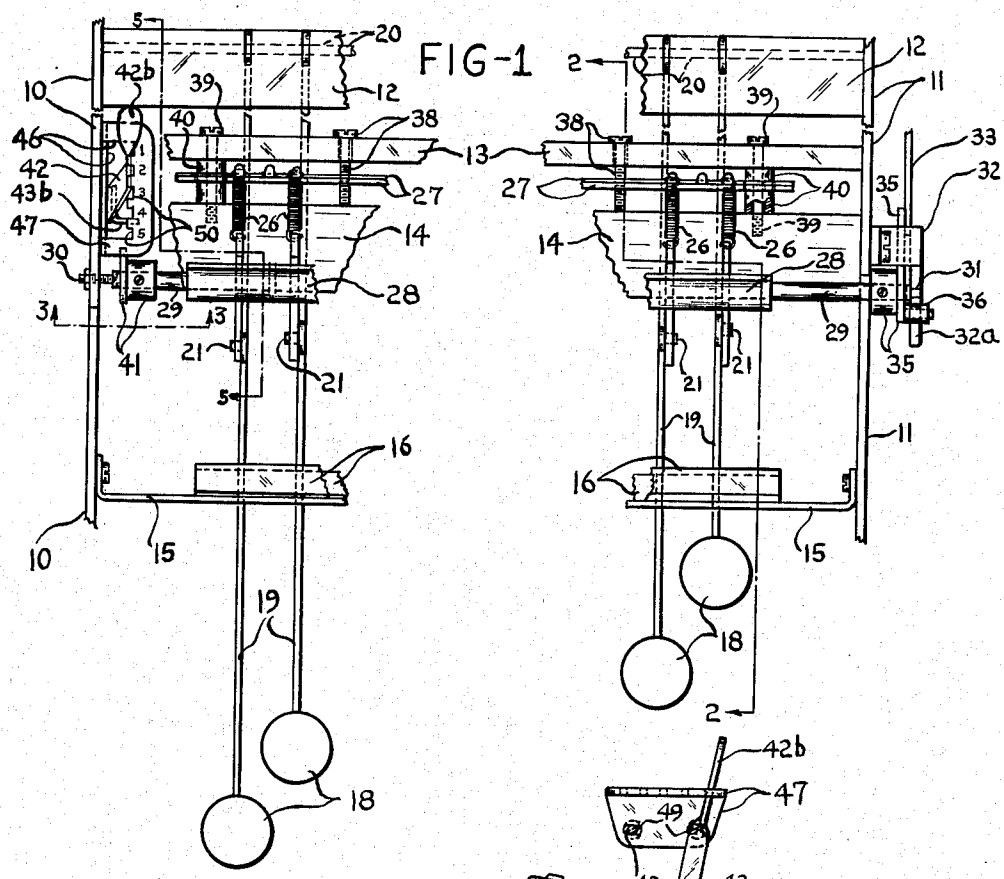
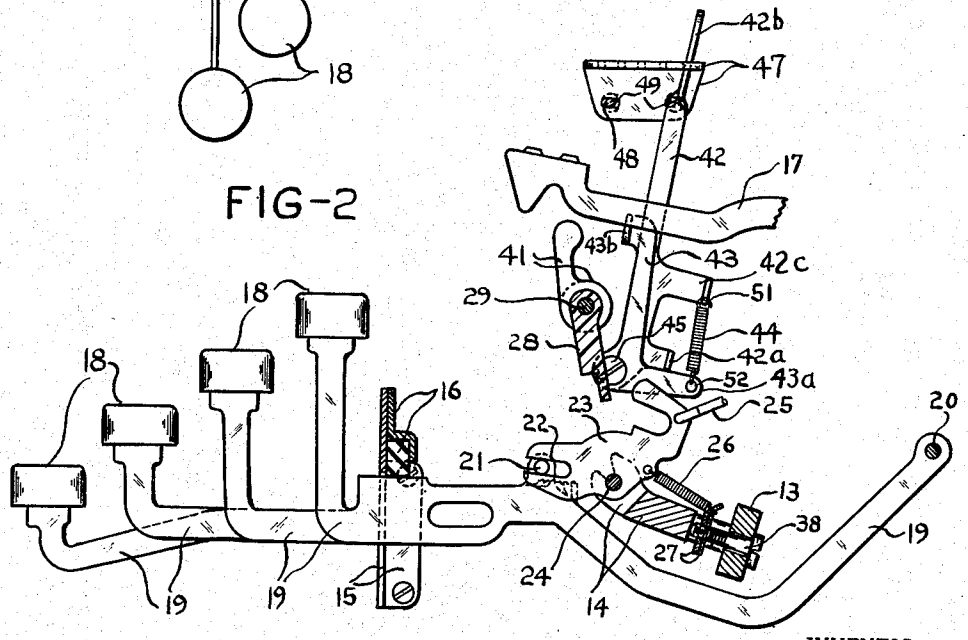


FIG-2



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TYPEWRITER KEY TOUCH CONTROLLING MEANS

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FIG-3

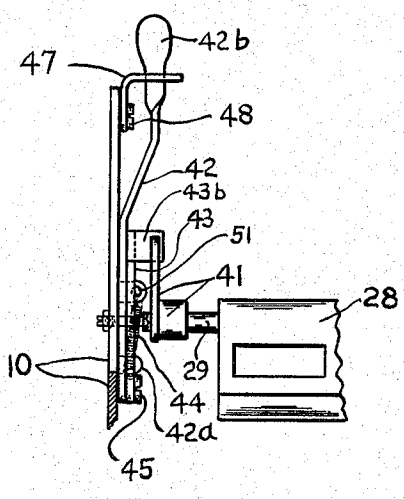


FIG-4

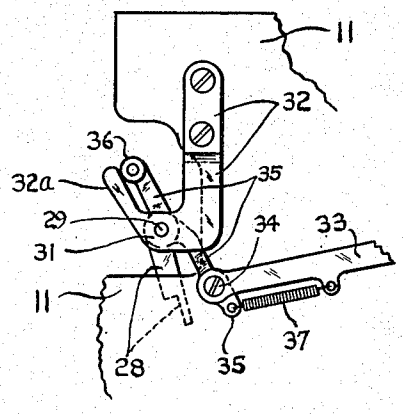


FIG-5

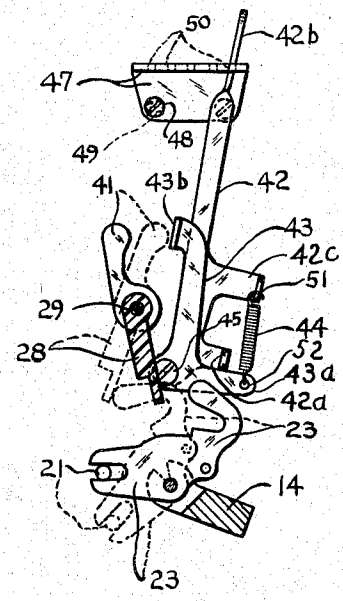
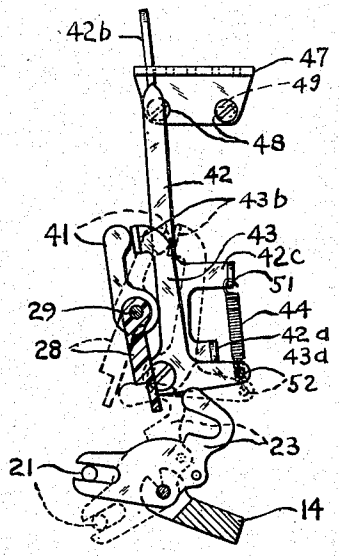


FIG-6



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TYPEWRITER KEY TOUCH CONTROLLING MEANS

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9 Claims. (Cl. 197—33)

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The invention relates to improvements in typewriter key touch controlling means and is adapted for use especially to effect variable regulation of the operating touch of the set of printing keys of a typewriter.

One object of the invention is to provide simple, efficient and economical means adapted for coaction with a key, or a set of keys, of a typewriter to regulate the operating key touch and which readily may be set variably by a typist to change the operating key touch.

Another object of the invention is to provide improved touch controlling means for the spring returned keys of a typewriter whereby the effective force of all of the key return springs of the typewriter readily may be regulated collectively by an assembly or repair man and the typist readily may increase selectively the heaviness of the touch of the printing keys of the typewriter without affecting the regulation of the effective force of the key return springs.

A further object of the invention is to provide a typewriter key touch controlling device which is free from supporting, attaching and guiding connections with a key operated universal bar; which is settable in an ineffective position and in different effective positions relatively to said universal bar; which will offer a progressively increasing spring resistance of like initial effective force to completion of key operated movements of the universal bar in all effective set positions of the device but becomes initially effective at a point in such bar movements which differs in accordance with the different effective settings of the device; and which does not move, in whole or in part, in response to movements of the universal bar while the device is in its ineffective set position.

A further object of the invention is to provide a key touch controlling coil spring and improved variably settable supporting means anchoring said spring at its ends and operable in response to operating key strokes to stretch said spring an extent which varies in accordance with different settings of said means.

To the above and other ends, which will hereinafter appear, the invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following description and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a fragmentary top plan view of a key operated front strike typewriter equipped with touch controlling means embodying the invention

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in its preferred form, many parts of the typewriter being omitted and others broken away for better illustration of the invention;

Fig. 2 is a fragmentary vertical longitudinal sectional view of the machine on the line 2—2 of Fig. 1 with certain parts omitted and others broken away;

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary right hand side elevational view of the machine;

Fig. 5 is a detail sectional view on the line 5—5 of Fig. 1 showing the settable touch control device set for lightest touch; and

Fig. 6 is a view similar to Fig. 5 showing the settable device set for heaviest touch.

Only so much of the typewriter is shown and will be described as is necessary to a full understanding of the present invention.

The stationary main framework of the typewriter comprises rigidly connected parts, including two side plates 10 and 11, three horizontal cross bars 12, 13 and 14, a key lever guide 15, and a horizontal key lever return stop device 16. Each type bar of the machine, one of which is shown in part at 17, is actuative to printing position by a separate printing key, certain of these keys being shown and designated 18. The printing keys are carried by individual key levers, some of which are shown and designated 19. The key levers support the printing keys in four banks and all are fulcrumed at their rear ends on a horizontal pivot rod 20 and carried by cross bar 12.

Each key lever is provided with a laterally extending pin 21 engaged in a slot 22 in one arm of a different one of a set of bellcrank sub-levers 23 all of which are fulcrumed on a horizontal pivot rod 24 carried by crossbar 14. The pins of the key levers of each bank are staggered relatively to those of each of the other banks, as indicated in Fig. 1, for uniform rocking of all of the bellcranks. Each bellcrank is drivable by its connected key lever, on the operating strokes of the printing key on said lever, to actuate an associated one of the type bars to printing position through a suitable individual bellcrank and type bar connecting linkage, one such linkage being shown in part at 25 (Fig. 2).

The several type bar actions are restored to normal position by individual return springs 26 which are anchored at their ends to the bellcranks and a return spring anchor bar 27 to normally yieldingly hold the type bars retracted from printing position and hold the key levers

rocked against the key lever stop device. The anchor bar comprises two welded or otherwise rigidly connected metal strips.

The typewriter has a key operated universal bar 28 fixed on a horizontal rock shaft 29 journaled at one end on a pivot screw 30 carried by side plate 10, said shaft having a reduced end portion journaled at 31 in a sheet metal bracket 32, which is fixed to side plate 11. The universal bar is employed to actuate certain mechanism of the typewriter including a part 33 pivoted at 34 to a pendent arm of a lever 35. Lever 35 is fixed to the rock shaft and has an upwardly extending stop arm carrying a suitable bumper 36 which normally abuts an upstanding stop arm 32*a* formed on bracket 32, which arm 32*a* is bendably adjustable fore and aft of the machine to adjust the normal or returned position of the universal bar. In its normal returned position, the universal bar extends across the machine with its lower portion spaced slightly forward of the upwardly extending arms of the bellcranks 23, said bar being rockable forwardly by any actuated one of the bellcranks on the operating or down strokes of the key actuating that bellcrank and after a slight initial depression of said key. A spring 37 (Fig. 4) is connected to part 33 and the lower end of lever 35 to return the universal bar.

It is desirable that the key touch of a typewriter readily may be regulated by individual typists, but it is undesirable that, by such regulation, the effectiveness of the key returning springs may be so reduced as to adversely affect proper functioning of the machine. Regulation of the effective force of the key lever return springs should be confined to repair men and typewriter production men, and variation by typists of the normal key touch thus established should be effected by means other than variation of the normal tension of the key lever return springs. Furthermore, a typewriter commonly has at least 42 key lever or other return springs for the type actions, one for each type action, and it requires considerable effort to collectively adjust their tension.

The means shown whereby the normal touch may be established by collective adjustment of the normal tension of the type action return springs, and whereby such normal touch readily may be varied by the typist, without altering the effective force of the return springs, now will be described.

The provision for collective adjustment of the normal tension of the type bar action return springs 26 comprises supporting the spring anchor bar 27 on a plurality of adjusting screws 38 which extend loosely through holes in, and spaced along, bar 13 with said screws threaded through the spring anchor bar 27 and abutted against the rear edge of bar 14. By turning the screws 38 with a screw driver the spring anchor bar may be shifted along the screws substantially longitudinally of the return springs 26. Preferably, at suitable intervals along bars 13 and 14, screws 39 pass loosely through rigid metal spacing sleeves 40 which extend through clearance holes in anchor bar 27 with the ends of the sleeves abutting the bars 13 and 14 to maintain a fixed spacing between said bars throughout their lengths.

The invention is concerned primarily with the further provision of typist settable means whereby the desired normal minimum key touch established by adjustment, as above described, of the type action return spring anchor bar, may be varied without changing the effective force of the return springs, and this typist settable means now will be described.

An upstanding tappet arm 41 is fixed on the left hand end of the rock shaft 29 adjacent the inner face of side plate 10 to rock with the universal bar 28. Full depression of any key 18, i. e. depression of such key until arrested by engagement of a type on the connected type bar with paper backed by the platen (not shown) of the typewriter, drives the connected bellcrank 23 and the universal bar 28 and tappet arm 41 from their respective normal positions, shown in full lines in Figs. 5 and 6, to those shown in dotted lines in said views.

A readily hand settable spring device is mounted on side plate 10 and is located at the inner side of said plate for coaction with the tappet arm 41 to regulate variably the touch of all of the printing keys 18 of the typewriter. While, if desired, the range of setting movements of this device obviously may be such that it will influence the key touch in all set positions of the device, its setting range preferably, and as shown, is such that said device is so positioned at one limit of its setting range as to have no influence on the key touch, as will appear from Fig. 5 and be explained more fully.

The spring device comprises two sheet metal bellcrank levers 42 and 43 and an auxiliary touch regulating spring 44. Each bellcrank lever has an upstanding arm and an arm extending rearward from the lower end portion of said upstanding arm. The two levers are pivoted side by side on a pivot screw 45 at the lower ends of their upstanding arms and are confined, adjacent said screw, between the head of the screw and the inner face of side plate 10, said screw being threaded into said plate. The upstanding arm of lever 42 is formed with a finger piece 42*b* shiftable in and along a closed slot 46 in a sheet metal bracket 47, which bracket is held to the side plate 10, at the inner face of said plate, by clamping screws 48 threaded into said plate. To permit adjustment of the bracket 47 fore and aft of the typewriter, the shanks of screws 48 pass through elongated slots 49 in said bracket. The upstanding arm of bellcrank lever 42 is inherently laterally resilient to releasably hold the lever in different set positions through selective engagement of finger piece 42*b* in different ones of a series of notches 50 formed in bracket 47 along one edge of slot 46. Suitable index numerals may be provided on the bracket opposite notches 50, such as the numerals 1 to 5 shown on said bracket in Fig. 1.

The before-mentioned rearwardly extending arm of lever 42 is formed with a stop lug 42*a* for engagement with the rearwardly extending arm 43*a* of lever 43. The lever 42 has a second rearwardly extending arm 42*c* higher up thereon, and a coil spring 44 has one of its end coils hooked to arm 42*c* at 51. The other end of spring 44 has a coil hooked to the arm 43*a* of lever 43 at 52. The rearwardly extending arm 43*a* of the lever 43 is thus normally held engaged with the lower edge of stop lug 42*a* by a predetermined normal pull exerted on levers 42 and 43 by the spring 44.

Lever 43 is formed at the upper end of its upstanding arm with a tappet lug 43*b* in the path of rearward movement of the upper end of tappet arm 41. Lever 43 thus is an anchor for one end of spring 44 and is drivable by the universal bar to progressively stress said spring, while lever

42 is an anchor for the other end of said spring and is settable to hold that end of the spring stationary in different positions.

It will be obvious that the setting range of the spring device 42—43—44 is limited by the length of the slot 46 in bracket 47 and is such that the setting of the device may be changed without any change of the normal relation of parts 42—43—44 or of the normal tension of spring 44. The setting of the device may be changed merely by shifting the finger piece 42b from any notch 50 to another of said notches. It further will be obvious that driving of the lever 43 by tappet arm 41 will progressively stretch spring 44.

In Figs. 1 to 5 the typewriter is illustrated with the spring device set in its ineffective position in which finger piece 42b of lever 42 is engaged in the rearmost notch 50 in bracket 47. In this setting of the device, the tappet lug 43b on lever 43 is spaced a substantial distance behind tappet arm 41 so that, on the operating down stroke of any key 18, said tappet arm will not rock lever 43 to stretch spring 44, said spacing preferably being such that the tappet arm and lug, as shown in dotted lines in Fig. 5, do not come into contact when the keys are operated.

In Fig. 6 the spring device is shown set for the heaviest touch procurable within its range of setting adjustment, the finger piece 42b in this setting of the device being engaged in the foremost notch 50 in bracket 47. In this setting, the tappet arm and tappet lug are (as shown in Fig. 6) normally substantially in contact and, on the down or operating stroke of any printing key 18, the lever 43 will be rocked at least substantially throughout the key operated movement of the universal bar and will progressively stretch the spring 44 until the operating stroke of the key is completed. In the several intermediate settings afforded by the remaining notches 50 in bracket 47, the stretching of spring 44 will be started at different later points in the key driven movements of the universal bar, thereby varying the extent of stretching of the spring 44 to vary the key touch.

It will be observed that the initial resistance of the spring 44 to key depression always remains the same, but that the spring resistance starts, in each different effective set position of the spring device, at a different point in the down stroke of any key and thereafter progressively increases until such stroke is completed. This feature, and that of the normal spacing between the universal bar and bellcranks 23, permits easy starting of the type bar actions without undesirable finger shock in all settings of the spring device. It affords also a cushioning of the typist's fingers which increases in effectiveness as the device is set for heavier and heavier touches.

It further will be noted that the setting lever 42 and the spring stressing lever 43 of the spring device 42—43—44 support the coil spring 44; that this spring is securely anchored at opposite ends thereof to different ones of these levers; that spring 44 normally yieldingly maintains the spring device conditioned for variable setting movement as a unit about the supporting pivot 45; and that the spring device is operable by the universal bar to stretch the spring 44 but is supported entirely independently of the universal bar.

Further, the spring device can be rendered ineffective at will and, being free of attachment to the universal bar, no part of the device will move when the device is set in ineffective position.

I claim:

1. A variable key touch typewriter having, in combination, a universal bar, key actions individually operable to impart finger powered strokes to the bar, a return spring connected with the bar to stroke the bar to a rest position, an auxiliary spring for regulating the operating touch of the key actions, an anchor for the auxiliary spring drivable by finger powered strokes of the bar thereagainst and returnable by said auxiliary spring, and a holding anchor for the auxiliary spring adjustable to arrest said universal bar drivable anchor in different selected returned positions in all of which said auxiliary spring is maintained under the same stress by its said anchors.

2. A variable key touch typewriter, as claimed in claim 1, wherein said holding anchor is adjustable about a fixed axis, and wherein said universal bar drivable anchor is rockable about said axis relatively to the holding anchor and is constrained by said spring into arrested engagement with the holding anchor while the universal bar is in rest position.

3. A variable key touch typewriter, as claimed in claim 1, having individual returning springs anchored to the respective key actions, and also having an anchor member to which all of said key action returning springs are anchored and which is adjustable to vary the stress of said springs collectively and thereby further regulate the operating touch of the key actions.

4. A variable key touch typewriter having, in combination, a universal bar, a set of individually operable key actions for imparting finger powered strokes to said bar, a key touch regulating spring for said set of actions, and means mounted independently of said bar and supporting said spring at its ends comprising an adjustable holding anchor for one spring end and an anchor for the other spring end which is movable back and forth relatively to said bar along the path of finger powered strokes of the bar and is variably positionable along said path by said spring and the adjustable anchor to yieldingly oppose finger powered strokes of the bar.

5. A variable key touch typewriter, as claimed in claim 4, wherein said holding anchor is supported for adjustment about a fixed axis and the other anchor is supported for rocking thereof about said axis into abuttive engagement with the holding anchor by said spring and out of such engagement by said bar, and wherein the spring is a helical spring attached at its opposite ends to its respective anchors at points radially offset from said axis.

6. In a typewriter having a set of individually operable key actions, the combination with said set of actions of a tappet which is drivable by each of said actions through finger powered strokes of substantially equal range and which is biased to return to a rest position, an element advanceable toward said tappet about a fixed axis for retractive driving of said element about said axis by said tappet on its finger powered strokes, and means adjustable about said axis to selectively set said element about said axis into and out of the range of finger powered strokes of said tappet and to exert a like advancing effort on said element in its respective set positions.

7. A typewriter, as claimed in claim 6, wherein the means for selectively setting said element comprises a second element adjustable about said axis to limit advance of the first element about said axis toward said tappet, and a spring con-

necting said elements to yieldingly advance the first element against the second element.

3. In a variable key touch typewriter, the combination of a set of keys, a tappet biased to a normal position from which it is drivable through finger powered strokes in a fixed path by said keys, an adjusting lever having a handle and rockable about a fixed axis, means for releasably latching the adjusting lever in selectively adjusted positions, means for limiting the range of adjustment of the adjusting lever, a second lever variably advanceable about said axis toward the tappet into advance-arresting engagement with the adjusting lever for retractive driving of the second lever by the tappet on its finger powered strokes, and a spring engaged with both of said levers to normally yieldingly maintain the second lever in advance-arresting engagement with the

adjusting lever in all positions of the adjusting lever within its limited adjustment range.

9. A variable key touch typewriter, as claimed in claim 8, having a spring for biasing the tappet to its normal position, and means supporting the tappet for movements by its biasing spring and by the keys about a fixed axis which is parallel to the axis about which the adjusting lever and second lever are movable.

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