Aug. 8, 1939. W. A. DOBSON 2,168,518

TYPEWRITING MACHINE

Filed Oct. 1, 1936 2 Sheets-Sheet 1

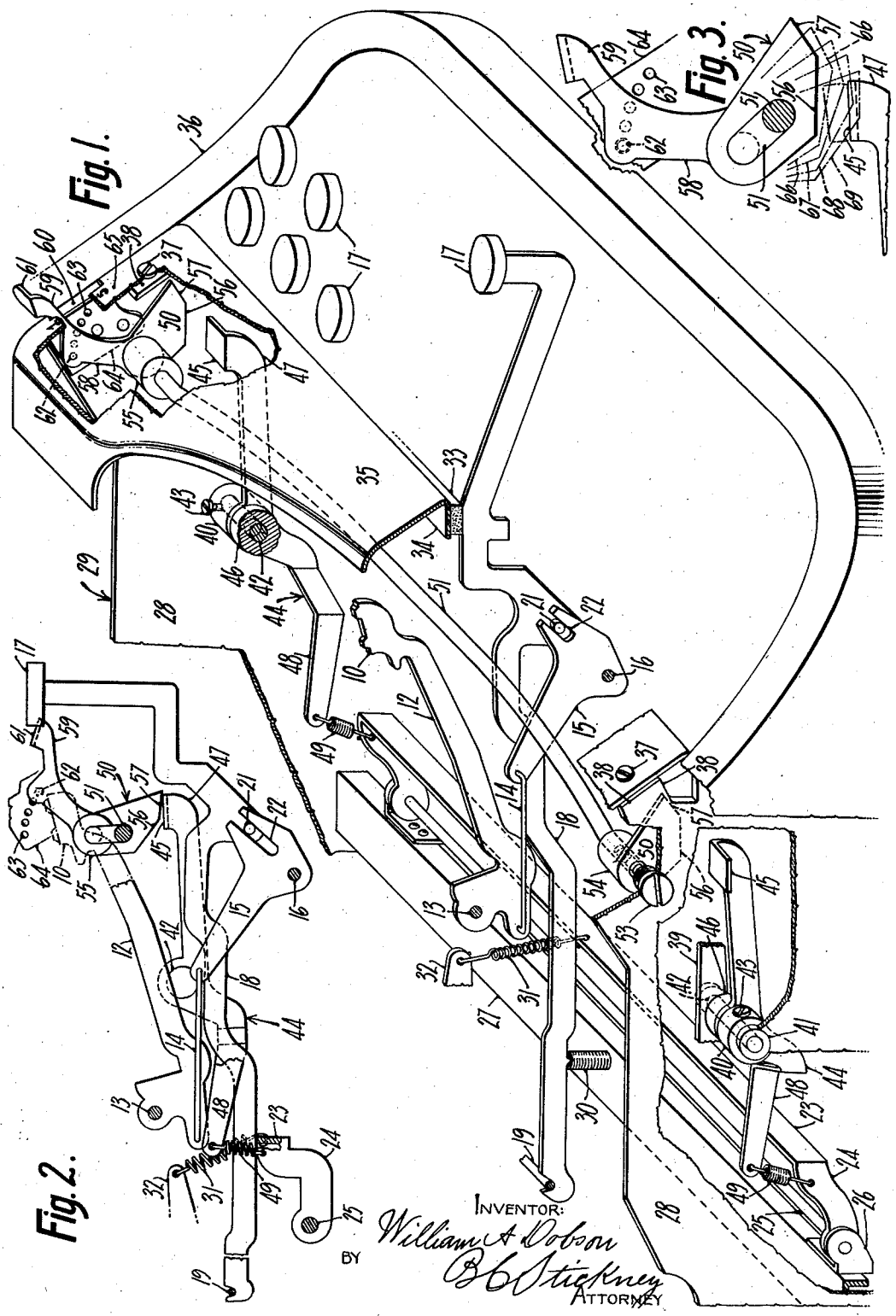


Fig. 1.

Fig. 3.

Fig. 2.

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Fig. 4

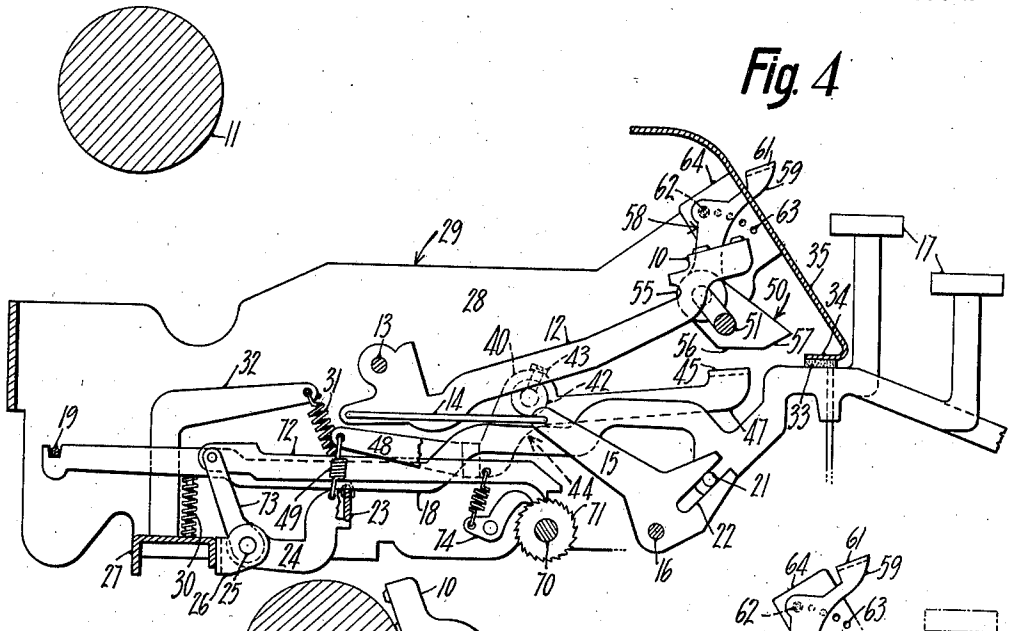


Fig. 5.

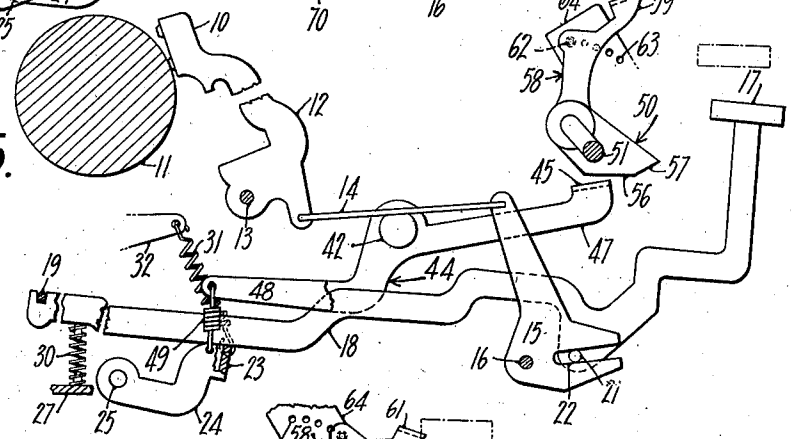


Fig. 6.

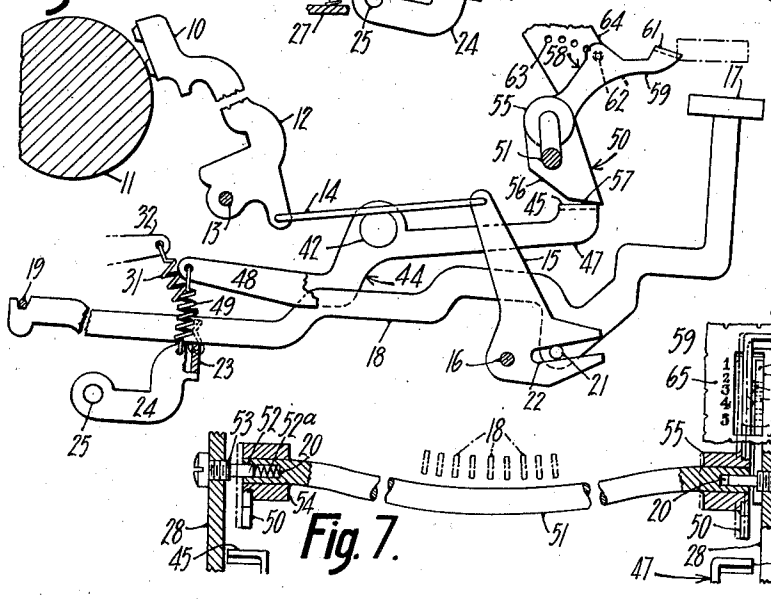


Fig. 7.

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UNITED STATES PATENT OFFICE

2,168,518

TYPEWRITING MACHINE

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19 Claims. (Cl. 197—33)

This invention relates to typewriters, and in particular to touch-control devices as employed therein to adapt the type-action to the touch of the typist.

The impact force of the type against the work-sheet varies in accordance with the speed of operation. For adapting the mechanism to different individual touches, a key-tensioning device is employed.

It is a feature of the invention to render the touch-control accessible, particularly as incorporated in Underwood Portable machines, for the reason that the small machine is largely used in the home by different members of a family. A touch-control lever, at the front of the machine, is adjacent the keyboard and is readily accessible for manipulation. Further, the control-lever is operable vertically so that upward and downward movements thereof readily become associated in the mind of the typist with a lifting or lightening of the tension and an increase of the tension, respectively. Manipulation of the touch-control member therefore is rendered more easy because the control is in plain sight and the necessity of searching at the sides or back of the machine for the control-lever is obviated.

A further feature of the invention is to provide a touch-control mechanism, employing a minimum number of parts, that can be mounted adjacent the sides of the machine-frame, taking up very little space within the machine and adapting itself to ready installation during the manufacturing process.

A still further feature of the invention is to provide a universal bar common to the key-levers having a single spring to hold the universal bar up against the under side of the key-levers and to provide an initial tension for said key-levers. This initial tension is augmented by the use of touch-control or key-tension springs, one of which is attached to each end of the universal bar, so that, as said touch-control springs are tensioned simultaneously, there will be no torsional effect produced in the universal bar. Each tension-spring is secured to one end of a rock-lever which is free to swing on its pivot an amount depending upon the adjusted position of a control-lever with which one end of said rock-lever coacts to tension its associated spring. The rocking movement of the levers is simultaneous with, and is caused by, the movement of the universal bar under key-lever operation. If the tension-control or touch-control lever is at its uppermost position, the key-levers, through the universal bar, can swing the rock-levers freely in a full movement without tensioning the touch or tension control springs. If, however, the control-lever is thrown down to one of its adjusted positions, it will interfere with the full swinging movement of said rock-levers and upon arresting the movement thereof will cause tensioning of the touch-control springs as the universal bar continues its downward movement under the influence of the key-levers. The adjusting movement of the control-lever in a downward direction in successive steps from its initial or starting position increases the key-tension in increments, so that the further down the control-lever is pressed, the greater will be the resistance to the key-lever action.

Other objects and features of the invention include the use of a control-lever mounting which permits simultaneous tensioning of the touch-control springs at opposite sides of the machine; and the yieldable mounting of said control-lever with relation to a detent-plate whereby the said lever is firmly held in any adjusted position and yet is easily moved over said detent-plate to any desired position. Also the various degrees of tension-adjustment are indicated by a scale adjacent the control-lever and prominently displayed.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a view in perspective, of a portion of a typewriter to which the invention is applied, parts being broken away to illustrate the arrangement of the touch-control means and its actuating lever at the front of the machine.

Figure 2 is a view in sectional side elevation showing the touch-control lever set to produce the greatest tension for the type-action.

Figure 3 is an enlarged view in side elevation of the adjustable positions of the touch-control lever.

Figure 4 is a view in sectional side elevation showing the relation of the key-levers and associated parts with the touch-control means including the universal bar, a ribbon-feeding device being also illustrated.

Figure 5 is a view in side elevation illustrating the type-action in operating position and the touch-control mechanism in initial position.

Figure 6 is a view in side elevation illustrating the operating position of the type-action under greatest tension provided by the touch-control lever.

Figure 7 is a fragmentary transverse section

showing the mounting of the touch-control lever and its associated parts.

Referring to the drawings in detail, types 10 are arranged to strike against a platen 11 carried in the usual manner in a carriage (not shown). Each type 10 is mounted on the end of a type-bar 12 fulcrumed on a rod 13 and connected by a link 14 to a bell-crank 15, which is pivoted on a rod 16. Swinging movement of the type against the platen is caused by depression of a key 17 mounted on the forward end of a key-lever 18, which is fulcrumed about a rod 19 suitably mounted in the machine-frame. A pin 21 on key-lever 18 in engagement with slot 22 of bell-crank 15 causes operation of the latter when the key-lever is actuated.

Extending under the key-levers 18 and transversely thereof is a universal bar 23 having at its opposite ends the rearwardly-extending arms 24 secured to rock-shaft 25, journaled in brackets 26 mounted on a channel-bar 27 which extends between the side members 28 of a main frame 29. A compression return spring 30 for each key-lever 18 is supported on the bar 27. A tension spring or main spring 31 connects the mid portion of the universal bar 23 with a bracket 32 mounted on the channel-bar 27 and acts to maintain the universal bar yieldably against the under side of the key-levers, so that the latter are urged upwardly against a pad 33. The pad is secured to the under side of flanged edge 34 of front cover-plate 35 which extends across the machine between the opposite sides of an outer frame 36, and is fastened by screws 37 to suitable lugs 38 on the side members 28 of the main frame 29.

For pivotally supporting some of the key-levers such as 39 on the side members 28 of main frame 29, aligned shoulder-bushings 40 may be riveted to said side members 28, so that a reduced portion 41 of each bushing may be riveted in a suitable opening in the frame side member 28. The shoulder of the bushing abuts the inner wall of adjacent side member 28. A flat or fillister head pin 42 inserted from the inside into each bushing 40 and held therein by a set-screw 43 affords a fulcrum for each of spring-tensioning lever-arms 44 and some of the key-levers referred to, which may be spaced from the lever-arms 44 by washers 46.

The lever-arms 44 are close to the sides of the machine-frame and are out of the way of other operating parts. These arms comprise forwardly and rearwardly extending portions 47 and 48 respectively, the forwardly-extending portions 47 being longer than the rearwardly-extending portions from the pivot-point or fulcrum-pin 42, thereby providing more weight in front of the fulcrum, so that key-tensioning springs 49 which connect the rear ends of the arms 44 to the arms 24 of the universal bar 23 will be held without slack. Movement of the universal bar 23 under influence of the keys will cause rocking movement of the lever-arms 44, so that tabs 45 on the forward portions 47 of said lever-arms may engage stop-plates 50 of a tension-control device which is operable from the front of the machine adjacent the keyboard.

The tension-control device includes a curved bar or rod 51 (Figures 1 and 7) extending laterally of the machine and mounted for oscillatory and rocking motion on the trunnion-ends 52 of screw-studs 53 threaded through the side members 28 of main frame 29. The rod 51 has secured to its opposite ends, by welding or any suitable means, hubs or collars 54, 55, each of which carries a depending stop-plate 50, the lower edge of which is cut to provide angularly-disposed edges 56, 57, which successively engage the tabs 45 to limit the throw of the lever-arms 44. The plate 50, at the right-hand end of rod 51, is extended upwardly to provide a tension-control lever 58, an extended portion 59 of which protrudes through an opening 60 in the front cover-plate 35 and terminates in a finger-piece 61. The extended portion 59 is provided with a protruding detent 62 which engages one of a plurality of openings or pockets 63 in a detent-plate 64 riveted or otherwise attached to the inner surface of the frame side member 28. Each trunnion-end 52 of stud 53 engages in a suitable bore 20 in the ends of the rod or bar 51, and, at the left side of the rod, a spring 52^a is positioned in the bore between the end of trunnioned-pin 52 and the bottom of said bore, so that the bar 51 is normally urged to the right to yieldably maintain the tension-control lever 58 in contact with the detent-plate 64. Manipulation of the lever 58 causes the detent 62 to snap into the various openings or pockets 63 of detent-plate 64. In this manner, the adjustment of the tension-control or touch-control lever can be made easily and quickly to any position desired.

In order to control the resistance of the key-levers to touch, the touch or tension control lever 58 may be swung up or down and yieldably held in any set position by the detent 62 and plate 64, as described. A scale 65 (Figure 7), providing the numerals "1" to "5", inclusive, co-operates with the lever 58 and the pockets or openings 63 to indicate the degree of tension afforded by adjustment of said control-lever 58.

The action of the touch-control device is such that the main spring 31 provides a fixed or normal resistance to the depression of the keys under the touch of the typist. Each downward movement of the universal bar 23 under the influence of key-lever action rocks the lever-arms 44 to raise the tab-ends 45. When the touch-control lever 58 is in the upper position (Figure 3), the stop-plate portions 50 are high enough to permit free rocking movement of the lever-arms 44 without the tabs 45 thereof engaging the stop-plates 50 to tension the springs 49. When the lever 58 is at "2" position, the stop-plates 50 are at outline position 66 and arrest the movement of the lever-arms 44 near the end of their upward swing with the result that movement of the universal bar after the arrest of the lever-arms 44 is against the simultaneous tension of the springs 49. Thus a resistance to the depression of the key-levers is introduced near the end of the stroke in addition to the regular or normal resistance offered by the spring 31. Stop-plates 50, in outline position 67, cause tensioning of the springs 49 earlier in the type-key stroke and thus introduce greater tension. The outline positions 68 and 69 of stop-plates 50 indicate simultaneous tensioning of the springs 49 in respectively increasing degrees by depression of the lever-arms 44 to place the springs 49 under tension during the entire stroke of the key-levers. The downward movement of the tension or touch control lever increases the tension on the key-levers 18 and thus permits ready and convenient adjustment of the resistance of the keys to the touch of the operator.

In addition to the accessible location of the touch-control lever 58, the graduated scale makes it easy for the individual to remember what number indicates the setting of the lever to suit his

touch. Also adjustment of the tension of the keys is facilitated when multiple-copy work is to be done and it becomes necessary to strike the keys with greater than usual typing force.

Advantage of the movements of the rock-shaft 25 is taken to operate ribbon-shaft 70 (Figure 4), to which is secured ratchet-wheel 71, actuated by ratchet-arm 72 which is reciprocated by a rock-arm 73 secured to shaft 25, reverse movement of wheel 71 being prevented by pawl 74.

The key-tension springs 49 may be referred to as auxiliary springs in that they coact with the main spring 31 when the mechanism is conditioned for key-tension. The simultaneous tensioning of the springs 49 prevents twisting of said universal bar and even yieldable resistance is offered to the depression of each key-lever at all adjusted positions of the mechanism, the degree of resistance depending of course upon the adjustment made.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A typewriter comprising, in combination, key-levers, a universal bar movable by the key-levers, lever-arms, a pair of springs connecting said universal bar and lever-arms for movement in unison without tensioning said springs, and a manually-operable device controlled from the front of the typewriter for limiting the movement of said lever-arms, whereby the springs will be tensioned simultaneously by movement of the universal bar.

2. A typewriter comprising, in combination, keys, key-levers, a universal bar depressible by said key-levers, a spring for yieldably resisting depression of the universal bar and key-levers, a second spring arranged to coact with the first spring to increase the resistance of the universal bar and key-levers to depression, a lever-arm linked at one end to the universal bar by said second spring and pivoted for free rocking motion under influence of the universal bar movement without tensioning said second spring, and a control member arranged to arrest the rocking motion of said lever-arm after a predetermined depression of said key-levers and universal bar whereby the second spring is tensioned.

3. A typewriter comprising, in combination, keys, key-levers, a universal bar, a spring for maintaining the bar in contact with the under side of said key-levers to exert a predetermined yieldable resistance to the depression of said key-levers, a lever-arm mounted for rocking movement, a second spring linking one end of said arm to the universal bar, said lever-arm being rockable by the universal bar and key-levers without tensioning said second spring, and a touch-control member disposed at the front of the machine adjacent the keys and operable to interfere with the rocking movement of said lever-arm to tension said second spring and add the resistance thereof to the resistance of said first spring in yieldably opposing depression of said universal bar and type-levers.

4. A typewriter comprising, in combination, keys, key-levers, a universal bar, a spring for keeping the bar in contact with the under side of the key-levers to yieldably oppose depression of said key-levers with a predetermined resistance, lever-arms mounted at the sides of the typewriter for rocking movement, a pair of springs each one of which connects an end of one lever-arm with one end of said universal bar, whereby the arms are rockable in unison by the universal bar without tensioning said pair of springs, stop-plates arranged for engagement with the end of each lever-arm whereby movement of the latter can be controlled and the pair of springs tensioned uniformly and simultaneously to add the resistance thereof to the resistance of said first spring in yieldably opposing depression of said universal bar and type-levers, and a touch-control lever for operating said stop-plates whereby the resistance of said pair of springs can be adjusted.

5. A typewriter comprising, in combination, keys, key-levers, a universal bar, a spring for maintaining the bar in contact with the under side of the key-levers to exert yieldable resistance to depression of the key-levers, lever-arms pivoted at opposite sides of the typewriter, an auxiliary spring connecting one end of each lever-arm with an end of the universal bar whereby the lever-arms will be rocked upon depression of said universal bar, a bar mounted for pivotal movement, a stop-plate at each end of the bar arranged for contact with a free end of each lever-arm whereby the rocking movement of each lever-arm is halted and the auxiliary springs are tensioned simultaneously upon a continued depression of the universal bar to increase the tension on the key-levers, and a control lever on said bar for adjustably positioning the stop-plates, said control lever being disposed at the front of the typewriter and adjacent the keys.

6. A typewriter comprising, in combination, keys, key-levers, a universal bar, a main spring for maintaining the bar in contact with the under side of said key-levers to exert a predetermined yieldable resistance to the depression of said key-levers, lever-arms mounted for rocking movement, auxiliary springs, each linking one end of a lever-arm with one end of the universal bar, whereby the lever-arms may be rocked by movement of the universal bar and key-levers without tensioning said auxiliary springs, a bar mounted for pivotal and oscillatory movement, stop-plates on the bar for limiting the rocking movement of the lever-arms, whereby the resistance of the main spring and auxiliary springs are combined to tension the key-levers, a finger-lever at the front of the machine for operating said bar, a detent for retaining the lever at any adjusted position, and a scale for indicating the degree of tension afforded by the adjustment of said lever.

7. A typewriter comprising, in combination, keys, key-levers, a universal bar, a main spring for maintaining the bar in contact with the under side of the key-levers to exert a predetermined yieldable resistance to the depression of the key-levers, a pivoted lever-arm, an auxiliary spring connecting one end of the lever-arm with the universal bar, the arm and universal bar being arranged to move in unison without tensioning said auxiliary spring, stop-means mounted for pivotal and oscillatory movement and arranged to vary the operation of said lever-arm, whereby continued relative movement of the universal bar tensions said auxiliary spring and combines the resistance of both of said springs in yieldably opposing depression of the key-levers for part of the stroke thereof, a touch-control lever for varying said stop-means, a detent for holding the lever at any varied position, and means for yieldably opposing sidewise movement of the stop-means and movement of said control lever relatively to said detent.

8. A typewriter comprising, in combination, key-levers, a universal bar extending across and beneath the key-levers, and depressible by said key-levers, a main spring for yieldably resisting depression of the universal bar and key-levers, a lever-arm, an auxiliary spring connecting the lever-arm and universal bar, whereby both may move in unison, means for limiting the movement of said lever-arm, comprising a stop-member, to tension the auxiliary spring for coaction with the main spring, and means for holding the stop member in various positions.

9. A typewriter comprising, in combination, key-levers, a universal bar extending across and beneath said key-levers, and depressible by the key-levers, a main spring for yieldably resisting depression of the universal bar and key-levers, a lever-arm, an auxiliary spring connecting the lever-arm with the universal bar, whereby both may move in unison, and means for limiting movement of the lever-arm, comprising a stop-member having angularly disposed edges for successive engagement with the lever-arm to vary the tension of the auxiliary spring for coaction with the main spring in yieldably opposing depression of said key-levers.

10. A typewriter comprising, in combination, keys, key-levers, a universal bar extending across and beneath the key-levers, and depressible by said key-levers, a spring for yieldably resisting depression of the universal bar and key-levers, a lever-arm, a second spring connecting the lever-arm and universal bar, whereby both may move in unison, means for limiting the movement of said lever-arm, comprising a stop-member, to tension said second spring for coaction with said first spring, a finger-lever at the front of the typewriter and adjacent the keys for adjusting said stop-member, yieldable means for holding the stop in various positions, and an indicator adjacent said finger-lever for showing the degree of tension given said second spring by the adjustment of said stop-member.

11. A typewriter comprising, in combination, key-levers, a universal bar movable by the key-levers, a lever-arm, a spring connecting the lever-arm and the universal bar for movement in unison without tensioning said spring, and a manually-adjustable device for limiting the movement of the lever-arm, whereby the spring will thereafter be tensioned by, and yieldably oppose, movement of said universal bar, said device being adjustable from an accessible position at the front of the typewriter.

12. A typewriter comprising, in combination, key-levers, a universal bar movable by said key-levers, a lever-arm, a spring connecting the universal bar and lever-arm for movement in unison without tensioning the spring, stop-means movable to engage the lever-arm and prevent movement thereof, whereby the spring is tensioned upon movement of the universal bar after the lever-arm is engaged, said stop-means including a rod mounted for pivotal and endwise movement, a lever-arm-engaging portion, an adjustable finger-lever, a detent, and a spring opposing endwise movement of said bar, whereby the finger-lever is yieldably held in adjusted contact with said detent.

13. A typewriter comprising, in combination, type-keys, a universal bar actuatable by said type-keys, a spring coacting with said universal bar to exert a predetermined yieldable resistance to depression of said type-keys, an element mounted for actuation in conjunction with actuation of said universal bar, resilient means connecting said element and universal bar so that said element is actuatable concomitantly with said universal bar and type-keys, and a touch-control regulator differentially settable to limit variably the actuation of said element whereby said resilient means is variably distorted and the resistance thereof variably added, for key-touch regulation, to the resistance of said spring in yieldably opposing depression of said universal bar and type-keys.

14. A variable-touch typewriter comprising, in combination, manually-operable typing levers, a universal bar movable by said typing levers, a lever-arm, a normally relaxed spring connecting the lever-arm and universal bar for initial movement of said arm and bar in unison substantially without distorting said spring, and a manually-regulatable touch-control device for selectively varying the limit of initial movement of said lever-arm to cause the spring to be tensioned by and yieldably to oppose the movement of said universal bar by the typing levers, in predetermined degrees.

15. A variable-touch typewriter including a plurality of depressible type-key members, a universal bar engageable by said key-members, a lever of the first class mounted on the typewriter, a normally relaxed spring connecting an arm of said lever with said universal bar for initial movement of said lever and bar in unison substantialy without distorting said spring, and a key-touch-regulating stop for engaging the other arm of said lever, said touch-regulating stop being adjustable selectively to various lever-controlling positions, each position predetermining the degree of key-touch-defining tensioning of said spring.

16. A variable-touch typewriter including a plurality of depressible type-key members, a universal bar engageable by said key-members, a lever mounted on the typewriter, a normally relaxed spring connecting said lever with said universal bar for initial movement of said lever and bar in unison substantially without distorting said spring, a key-touch-regulating stop, and means for selectively adjusting said touch-regulating stop to various lever-controlling positions, each position predetermining the degree of key-touch-defining tensioning of said spring.

17. A variable-touch typewriter including a plurality of depressible key-members, a universal bar engageable by said key-members, a lever mounted on the typewriter, a normally relaxed spring connecting said lever with said universal bar for initial movement of said lever and bar in unison substantially without distorting said spring, a key-touch-regulating stop for stopping the lever in various selective positions, whereby said spring may be variously tensioned in predetermined degrees to vary the key-touch, and means for securing the key-touch-regulating stop in the various positions.

18. A typewriter comprising, in combination, type key levers, a universal bar extending across said key levers and depressible uniformly throughout its length by any one of said key levers, a spring constantly resisting movement of said universal bar by the key levers, a pair of springs directly connected to said universal bar and normally free to move along with the universal bar so as not to resist the latter, and means acting to cause said pair of springs to be tensioned simultaneously by continued depression of any key lever, after a predetermined initial movement

of depression of said key lever and concomitant initial movement of the universal bar and pair of springs, said pair of springs when thus tensioned coacting with said first spring to increase the resistance of the key lever to depression after said predetermined initial movement thereof.

19. A typewriter comprising, in combination, type keys, a universal bar depressible by means of said keys, a spring yieldably resisting depression of the universal bar and type keys, another spring directly connected to said universal bar and normally free to move with said universal bar so as not to resist the latter, a lever connected to said spring and movable therewith, and a device adapted to arrest said lever movement after a predetermined initial depression of any type key and the universal bar and thereby cause said other spring to be tensioned by further depression of said key and universal bar, said device being adjustable to vary the extent of said initial depression of the type key and universal bar.

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