

May 14, 1929.

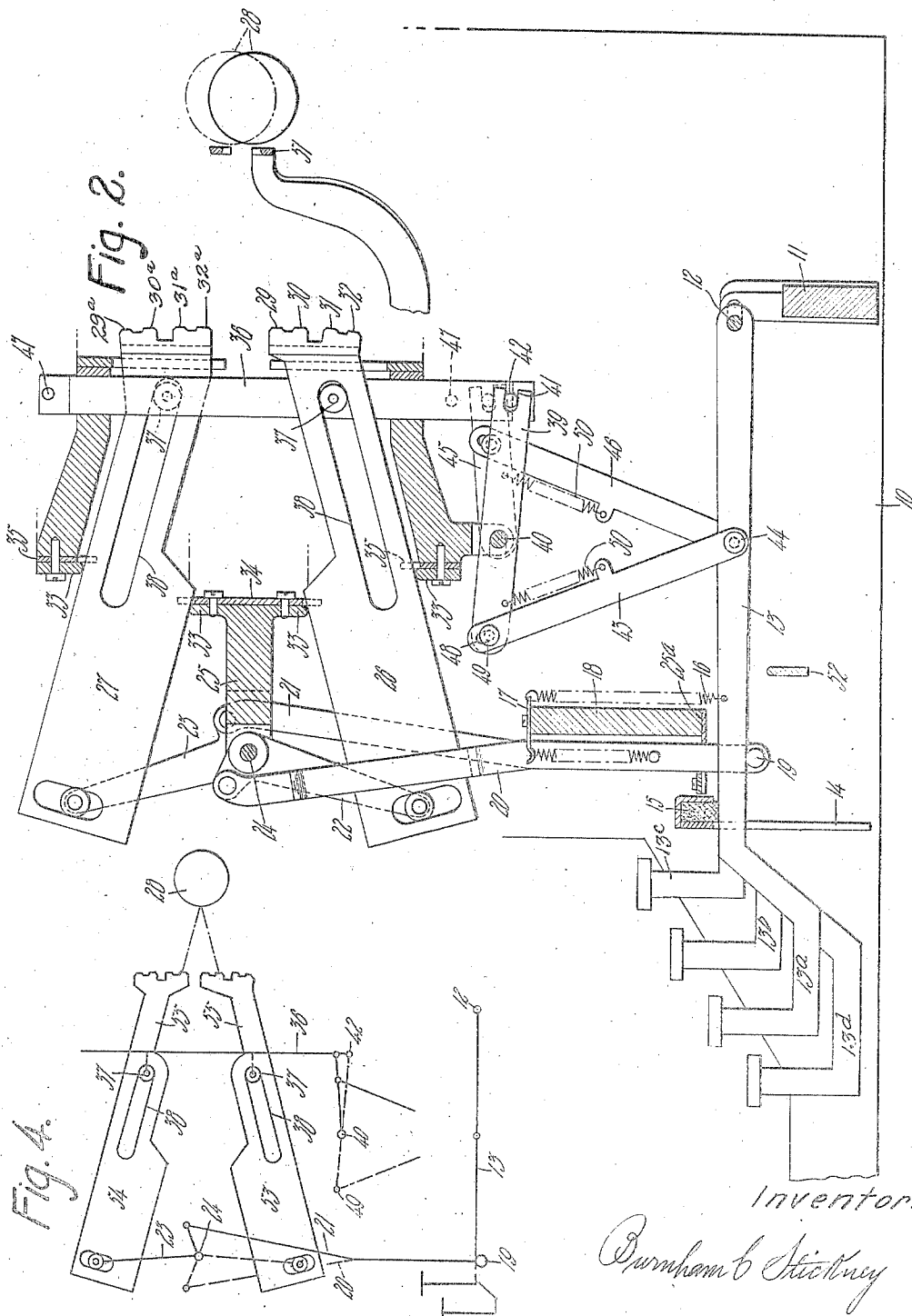
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1,713,010

TYPEWRITING MACHINE

Filed Sept. 25, 1925

3 Sheets-Sheet 2



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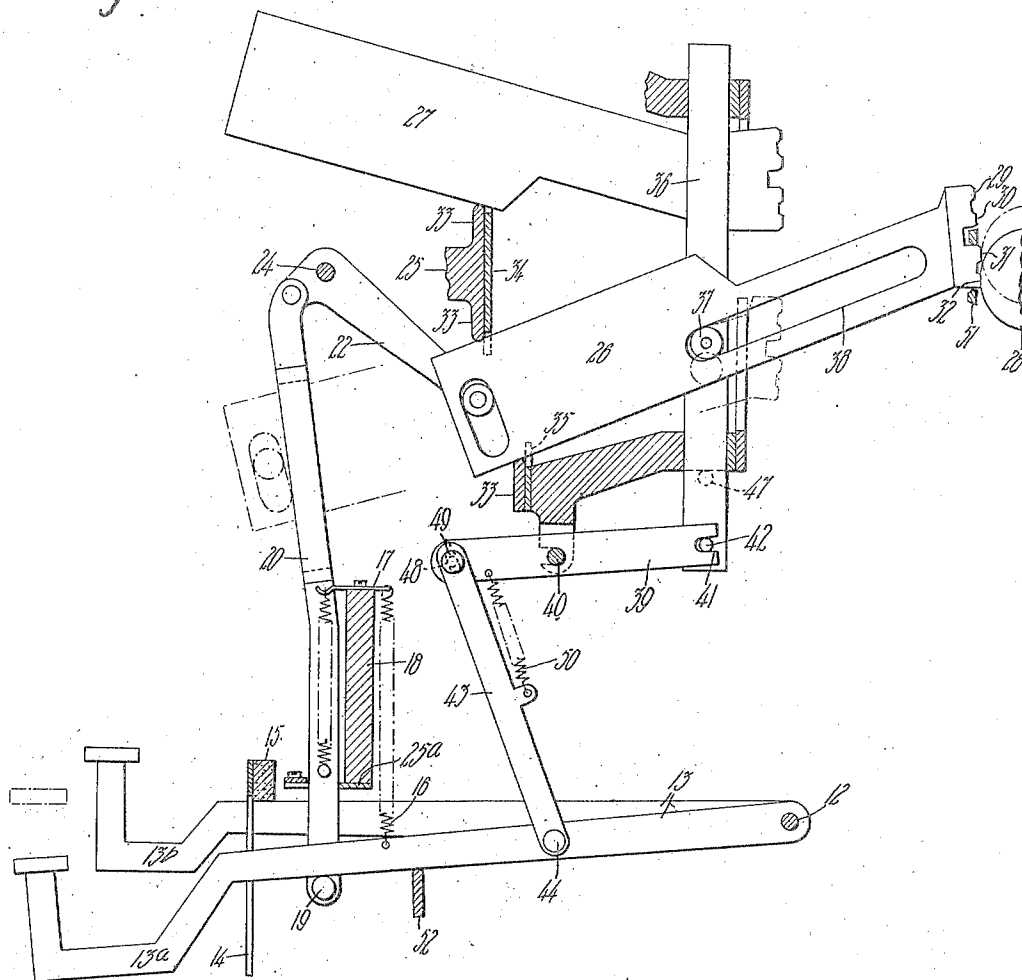
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Fig. 3.



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TYPEWRITING MACHINE.

Application filed September 25, 1925. Serial No. 58,473.

This invention relates to type-bar systems for typewriting machines, and has particular reference to that class of machines wherein the type-bars are endwise slidable to and from the platen.

A feature of the invention is the provision of a simple type-bar action, which will be compactly arranged for sliding movement of the type-bars against the platen.

In certain typewriting machines, for example, as illustrated in the patent to G. G. Going, No. 1,305,091, dated May 27, 1919, type-bars are mounted for sliding movement radially to the printing point. The number of type-bars necessary to provide a full complement of printing characters for a standard machine is such as to occupy a substantially great included angle, with the result that the type-bars disposed adjacent the sides of the assemblage slide obliquely against the platen, and because of this oblique movement, their types have a tendency to slip sidewise as they engage at the printing point. Such sidewise slipping causes blurred work.

In previous front-strike machines, the type-bars have usually been mounted for radial swinging or sliding movement to the printing point, forming a narrow system, and key-levers have been disposed parallel to one another in a much wider system. The necessary connecting means have included levers, links, etc., with complicated bends and movements to engage both members, and often the adjoining connecting means have differed from one another because of variations in the relative positions of type-bars and key-levers.

With the present invention, the tendency towards sidewise slipping of the type at the printing point is reduced to a minimum, insuring a better quality of work, as well as a faster operating machine. This is accomplished by arranging the type-bars in two rows, one above the other, said rows of type-bars being inclined towards the printing point in a vertical plane, and the individual bars being radially disposed in a horizontal plane. Each type-bar is preferably provided with four type-characters, and is operable by either one of a pair of keys. One key of each type-bar slides the type-bar rectilinearly against the platen, while the other key of the bar shifts the type-bar vertically at the same time as it moves against the platen in order to

bring the second pair of characters to the printing point. The platen may also be shifted, as is customary, for upper-case characters. With this arrangement, a standard four-bank keyboard having forty-two keys may be used in combination with twenty-one type-bars. Because of the fact that the type-bars are nested in two rows, the spacing between them may be less than has been customary heretofore, with the result that a small included angle is occupied by the series of type-bars, whereby the type-bars will not strike the platen so obliquely.

A feature of the invention resides in the provision of a compact type-action of extreme simplicity. This is accomplished by arranging the key-levers radially about the center in line with the printing point, whereby each key-lever is disposed in substantially the same plane as its corresponding rearwardly-striking type-bar. Thus, no complicated bends are required in the various parts forming the connecting means, simplicity is secured, binding of parts is avoided, and the manufacturing cost is greatly reduced. The type-bars are pivotally supported on an arcuate rod, the center of the arc being in line with the printing point, and the key-levers radiating from the center.

Other features and advantages will herein-after appear.

In the accompanying drawings,

Figure 1 is a top plan view of a typewriting machine, embodying the invention, with parts broken away, and other parts in section.

Figure 2 is a vertical, longitudinal, sectional view, through the machine, showing the parts in their normal positions.

Figure 3 is a fragmentary view similar to Figure 2, showing one of the type-bars striking the platen.

Figure 4 is a diagrammatic view of a form wherein the type-bars have a shorter stroke, each type in the lower row being in vertical alignment with a type in the upper row, the types in each row being contiguous or nearly touching one another.

In carrying out the invention, a typewriting machine frame 10 of any preferred form having a cross-piece 11, pivotally supports on a rod 12 a series of finger-key-levers 13. The pivot-rod 12 is arcuate in shape, having a center of curvature in line with the printing

point, and the key-levers are disposed in divergent relationship, as clearly shown in Figure 1. A comb-plate 14, having necessary vertical slots, acts as a guide for the forward ends of the key-levers 13, holding them against lateral displacement, and carries a stop-member 15, which limits the upward movement of the key-levers, and holds them in their normal positions. Coil-springs 16 draw the levers 13 upwardly against the stop 15, said springs being anchored to a plate 17 on the front bar 18 of the machine-frame.

As the key-levers 13 are depressed they engage projecting pins 19 carried by the lower extremities of links 20 and 21, the upper ends of which actuate bell-crank-levers 22 and 23, which are pivoted at 24 to the head 25 of the machine. A slotted plate 25^a, held by the front bar 18, guides the lower ends of the links 20 and 21, each link being positioned between a pair of key-levers, 13, and may be operated by either one of the levers of that pair.

Type-bars 26 and 27 slide inwardly to a printing point on a platen 28, motion being imparted to them by the long arm of bell-crank-levers 22 and 23, respectively. The type-bars are nested radially in two tiers or rows, one above the other, and inclined toward the printing point, the numeral 26 designating the type-bars in the lower row, and the numeral 27 referring to those in the upper row. Each type-bar carries a plurality of printing characters, here shown as four in number, and designated by the reference characters 29, 30, 31 and 32. On simply sliding a type-bar 26 inwardly, the printing character 31 is presented to the printing point, and by shifting the platen 28 to the dotted-line position in Figure 2, an imprint of the character 29 may be obtained. Stationary guides 33 support the type-bars in co-operation with slotted plates 34 and 35, sufficient clearance being provided between the guides 33 to allow for shifting the type-bars in a vertical plane to present the second set of printing characters to the printing point.

Vertically-disposed type-bar-supports 36 guide the inner or rear ends of the type-bars 26, having cylindrical bearing members 37 engaging in slots 38 in the type-bars. Levers 39, pivoted at 40, shift the lower type-bar-supports 36 through engagement of their slotted ends 41 with projecting pins 42, movement being imparted to the levers by links 43 connected at 44 to one of alternate pairs of key-levers 13. In the same manner, levers 45 shift the upper type-bar-supports through the instrumentality of links 46. By this arrangement, the type-bars in each row are shifted in opposite directions, those in the lower row being moved upwardly, while those in the upper row are moved downwardly, but it will be obvious that the two rows may be moved in the same direction, either up or

down. Stop-pins 47 limit the movement of the type-bar-supports 36, and after such movement is arrested, further depression of the key-lever is possible, because of a yielding connection between its link 43 or 46 and the corresponding lever 39 or 45.

The upper extremity of each link 43 and 46 is slotted, as at 48, for the reception of a pin 49, and coil-springs 50 are connected, as shown, between the links 43, 46 and the levers 39, 45. By this arrangement, as one of the links is moved downwardly by depression of a key-lever 13, the pin 49 will not, at first, be engaged, but will slide in the slot 48, while the springs 50 provide a yieldable connection between the operative members. A type-guide 51 receives the type-characters immediately in front of the platen, and guides them to the printing point, sufficient clearance being provided, as shown exaggeratedly in Figure 3, to allow free entry and withdrawal of the type.

The links 43 or 46 are connected to one of alternate pairs of key-levers 13, from which it will be evident, that upon depression of one key-lever of a pair, such as 13^a, the type-bar 26 will be moved inwardly towards the platen, by the link 20, and at the same time its type-carrying end will be raised vertically by the link 43 to position the character 32 to the printing point. Depression of the next key-lever 13^b will operate the same link 20 to slide the same type-bar inwardly, but having no link-connection 43 will not shift the type-bar vertically, thus presenting the character 31 to the printing point. Similarly the joining pair of key-levers 13 may be depressed to operate an upper type-bar 27. One key is 13^c operating the link 21 to move said type-bar inwardly towards the platen, and at the same time its support 36 will be drawn downwardly by the link 46 to present the character 31^a to the printing point. The other key of the pair is 13^d to operate the same link 21 to slide the type-bar 27 to the platen, but having no link-connection 46. The type-face 32^a will be present at the printing point of the platen when the platen is shifted upwardly to the dotted position. It is obvious that the depression of the two keys 13^a and 13^b will present the two type-faces 29 and 30 of the type-bar 26 to the printing point, and the adjoining pair of keys 13^c and 13^d will present the two types 30^a and 29^a to the type-bar 27 to type in case-shift characters.

From the foregoing, it will be evident that I have provided an improved simplified type-action for typewriting machines, wherein each type-bar and its respective key-lever are in substantially the same vertical plane. By this provision a simple connecting means is possible, and the parts including the connecting means may be duplicated for each type-bar, thus greatly reducing the cost of manufacture.

A universal bar 52 is disposed in the path of movement of the key-levers 13 and connected to an escapement-mechanism of any ordinary or preferred form, whereby the platen is letter-spaced as the typing progresses.

The distance through which the type-bar slides in its travel to the platen may be varied in accordance with the particular design of the machine. In the construction which has just been described, the types of the two rows of type-bars are staggered or not in vertical alignment. In Figure 4, a different arrangement is diagrammatically illustrated wherein the distance between the types in their normal position of rest, and the platen, has been decreased. The types of the two rows are arranged in vertical alignment, each type in the bottom row being directly beneath a type in the upper row, and the types being packed closely in each row, or the distance between the types in each row being reduced to a minimum. When this arrangement is used, the type-bars 53 and 54 may be cut away, as at 55, to provide proper clearance between the parts in the vertical shifting operation, otherwise the various connections are similar to those already described.

The keys having the same depth of stroke at Figure 4 as at Figure 2, the bell-crank arms 22 are made longer, since the stroke of the type at Figure 4 is much less than at Figure 2. It will be understood, however, that the types at Figure 4 can be placed farther away from the platen but still compacted together, thus keeping the type-system as narrow, and gaining the advantage of having the type-bars work in more nearly parallel planes and strike the platen more squarely than at Figure 1.

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. In a typewriting machine, the combination with a platen, of type-bars nested radially in two tiers about the printing point, each type-bar having a plurality of characters arranged in pairs, movable means for guiding the type-bars to the printing point, type-bar-operating key-levers, and yieldable connections between certain of said key-levers and the movable guiding means.

2. In a typewriting machine, the combination with a shiftable platen, of a slidable type-bar having sets of characters thereon, a pair of key-levers, type-bar driving connections between the type-bar and both key-levers and operative by both of the key-levers to move the type-bar rectilinearly, and type-bar lifting connections between the type-bar and one of the key-levers, said driving and lifting connections co-operative to move the type-bar both rectilinearly and vertically to bring a different set of characters to the printing

point, one key-lever and its connections being operable independently of the other key-lever and its connections.

3. In a typewriting machine, in combination, a revoluble platen, a series of slidable type-carriers arranged in tiers about the printing point and each having a plurality of types, a pair of key-levers for operating each type-carrier, and means operatively connected to one key of each pair for displacing the type-carrier, whereby both keys will actuate the same type-carrier and present different types to strike the platen.

4. In a typewriting machine, in combination, a revoluble platen, a series of slidable type-carriers arranged in tiers about the printing point and each having a plurality of types, a pair of key-levers for operating each type-carrier, a shiftable support for the rear end of each type-carrier, a link connecting each type-carrier with one of each pair of key-levers for shifting the type-carrier vertically to present a different set of types to the printing point, and means including a link engageable by both key-levers to move the type-carrier rectilinearly against the platen.

5. In a typewriting machine, in combination, a revoluble platen, a plurality of slidable type-bars arranged in tiers, one above the other, each type-bar having a plurality of types, a plurality of key-levers, and means including links engageable by the key-levers to move the type-bars rectilinearly against the platen, each link being engageable by two key-levers.

6. In a typewriting machine, in combination, a revoluble platen, a plurality of slidable type-bars arranged in tiers, one above the other, each type-bar having a plurality of types, a plurality of key-levers, means including links engageable by the key-levers to move the type-bars rectilinearly against the platen, each link having its lower end disposed between two adjacent key-levers, and means for moving the links downwardly by actuation of either of said adjacent key-levers.

7. In a typewriting machine, in combination, a revoluble platen, a plurality of type-bars arranged in tiers, one above the other, the type-bars being inclined to the printing point and having a plurality of types, a plurality of key-levers, means for selectively moving the type-bars rectilinearly against the platen by actuation of the key-levers, and means for additionally shifting the type-bars in a vertical plane by actuation of half the number of key-levers.

8. In a typewriting machine, in combination, a revoluble platen, a plurality of rows of type-bars, each having a plurality of types, a plurality of key-levers, means including a set of links to move the type-bars rectilinearly against the platen, said links being operated by their adjacent key-levers, vertically-shiftable supports for the rear ends of

the type-bars, and means connecting alternate key-levers with said shiftable supports to displace the type-bars and present a different set of characters to the printing point.

- 5 9. In a front-strike typewriting machine, the combination with a shiftable platen, of type-bars nested radially about the printing point, each type-bar having more than two types, individually movable supports for the
10 type-bearing end of each type-bar, key-levers, a connection between each type-bar and two adjoining key-levers, whereby either key-lever will move the type-bar rectilinearly against the platen, and connecting mechanism
15 between the movable support of each type-bar and one of two adjoining key-levers, operable to shift the type-bar to present additional characters to the printing point, each key-lever being independently operable to
20 type a character.

10. In a front-strike typewriting machine, a type-action including a rectilinearly-movable type-bar having a plurality of characters, a pair of key-levers, means operatively
25 connected to both key-levers for moving the type-bar against the platen, said means including a link pendent between the pair of key-levers and formed with transverse extensions to underlie each key-lever whereby
30 either one the key-levers will independently actuate the type-bar, and means including connections between one of the key-levers and the type-bar, operative to shift the type-bar in a vertical plane simultaneously with
35 the rectilinear movement thereof.

11. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in two rows, one above the other, a series of key-levers, means to slide the type-bars rectilinearly against the platen by operation
40 of the key-levers, and additional means for shifting one row of type-bars upwardly, and the other row downwardly to present different characters to the printing point.

12. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in two rows, one above the other and inclined toward the printing point, a series of key-levers, means to slide the type-bars rectilinearly against the platen by operation
50 of the key-levers, and means to additionally shift one row of type-bars upwardly, and the other row downwardly to present different characters to the printing point.

13. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in two rows, one above the other and inclined toward the printing point, a series of key-levers, means to slide the type-bars rectilinearly against the platen by operation
60 of the key-levers, and means to additionally shift the lower type-bars upwardly, and the upper type-bars downwardly to present different characters to the printing point.

14. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in two rows, one row above and the other row below the printing line, and both rows inclined towards the printing point, a series of key-levers arranged in pairs, means
70 operative to slide each type-bar rectilinearly against the platen by the depression of either one of a pair of key levers, and means operatively connected to one key-lever of each pair
75 to effect a vertical shift of a type-bar either up or down according to a predetermined plan, to present different characters on the same type-bar to the printing point.

15. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in two rows, one above the other and inclined toward the printing point, a series of key-levers, means to slide the type-bars rectilinearly against the platen by operation
80 of the key-levers, and means to vertically shift the independent type-bars in each row to present different characters to the printing point, the type-bars in one row being shiftable in the opposite direction from
90 those in the other row.

16. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in rows, one above the other, a series of key-levers, shiftable supports for
95 type-ends of the type-bars, means for sliding the type-bars rectilinearly against the platen by operation of the key-levers, and means for shifting the type-bar-supports by operation of some of the key-levers.

17. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in rows, one above the other, a series of key-levers, fixed supports for one end of the type-bars, vertically-movable supports
105 for the other end of the type-bars, means for sliding the type-bars rectilinearly against the platen by operation of the key-levers, and means for operating the vertically-movable supports by actuation of certain of the key-levers.

18. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in rows, one above the other, a series of key-levers, fixed supports for one end of the type-bars, vertically-movable support
115 for the other end of the type-bars, means for sliding the type-bars rectilinearly against the platen by operation of the key-levers, and means for operating the vertically-movable supports by actuation of certain of the key-levers, the type-bar-supports of one row being movable in the opposite direction from
120 those of the other row.

19. In a typewriting machine, the combination with a platen, of a series of type-bars arranged in rows, one above the other, a series of key-levers, fixed supports for one end of the type-bars, vertically-movable supports for the other end of the type-bars, 125

means for sliding the type-bars rectilinearly against the platen by operation of the key-levers, and means for operating the vertically-movable supports by actuation of certain 5 of the key-levers, the type-bar-supports of the lower row being movable upwardly, and the type-bar-supports of the upper row being movable downwardly to present additional characters to the printing point.

10 20. In a typewriting machine, the combination with a platen, of a series of type-bars nested radially in two tiers about the printing point for sliding movement against the platen, a series of key-levers operative in 15 pairs and pivotally mounted in divergent relationship on an arcuate pivot, connecting means whereby the depression of one of any pair of key-levers will slide a type-bar inwardly against the platen, and additional 20 means connected to one key-lever of the pair to simultaneously shift the same type-bar up

or down in a vertical plane to the typing position.

21. In a typewriting machine, the combination with a platen, of type-bars nested 25 radially in two tiers before the printing point, said type-bars being inclined toward the printing point and having the type-characters in the two pairs in vertical alignment, key-levers operative in pairs and 30 mounted in divergent relationship, each pair of key-levers being in substantially the same plane at its type-bar, and connecting means to selectively slide a type-bar or case-shift and slide a type-bar inwardly against the platen 35 by the depression of a key-lever of a pair of key-levers, said means including a single link-connection to one key-lever of a pair, and a double link-connection to the other key-lever of the same pair.

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