

C. E. TOMLINSON.  
TYPE WRITING MACHINE.  
APPLICATION FILED SEPT. 25, 1907.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.

949,508.

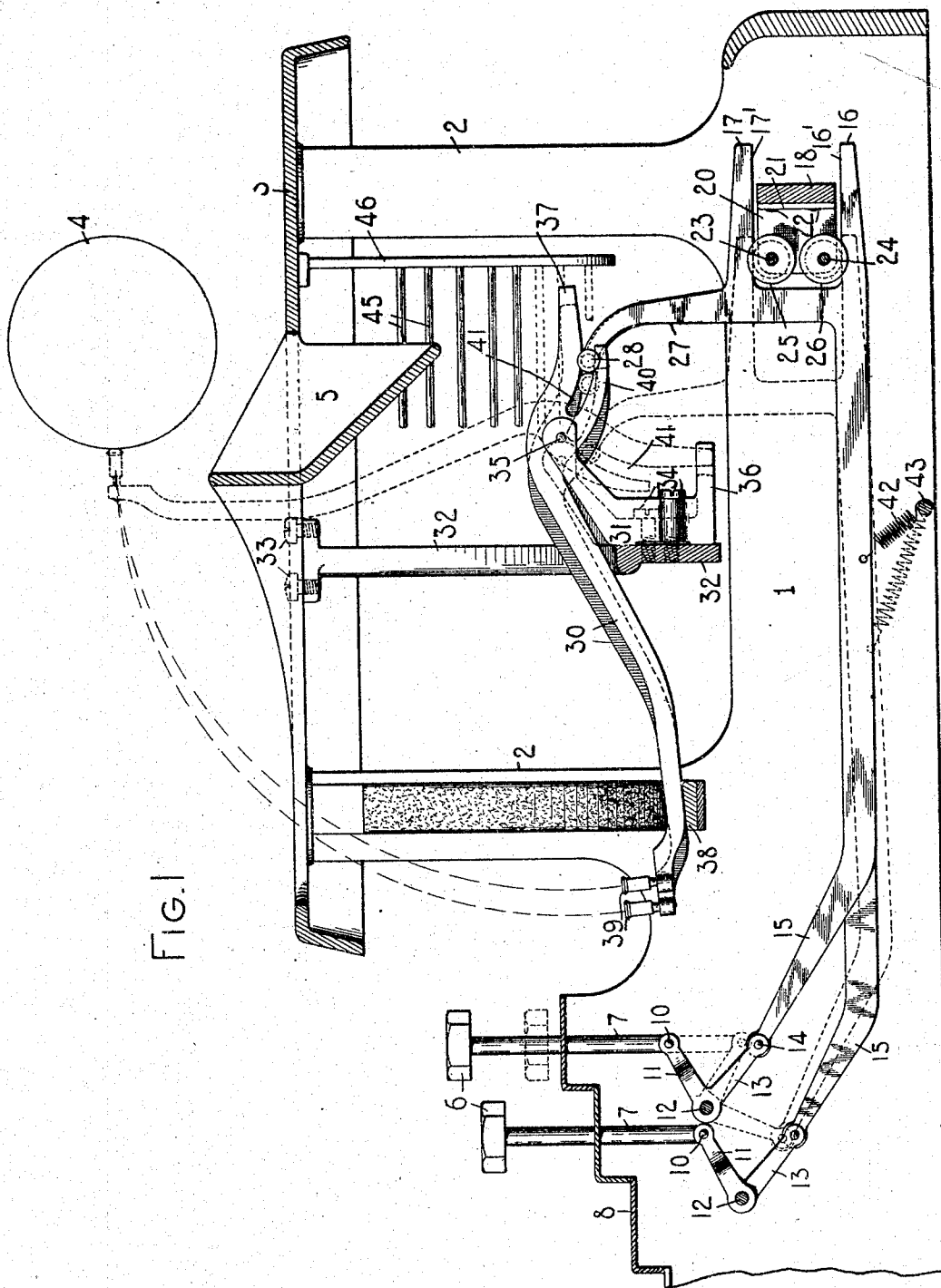


FIG. 1

WITNESSES:

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2 SHEETS—SHEET 2.

FIG. 2.

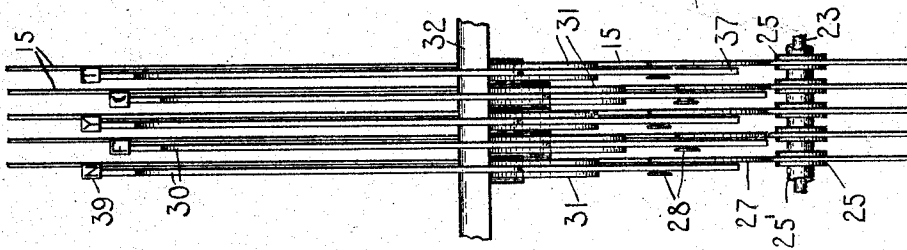
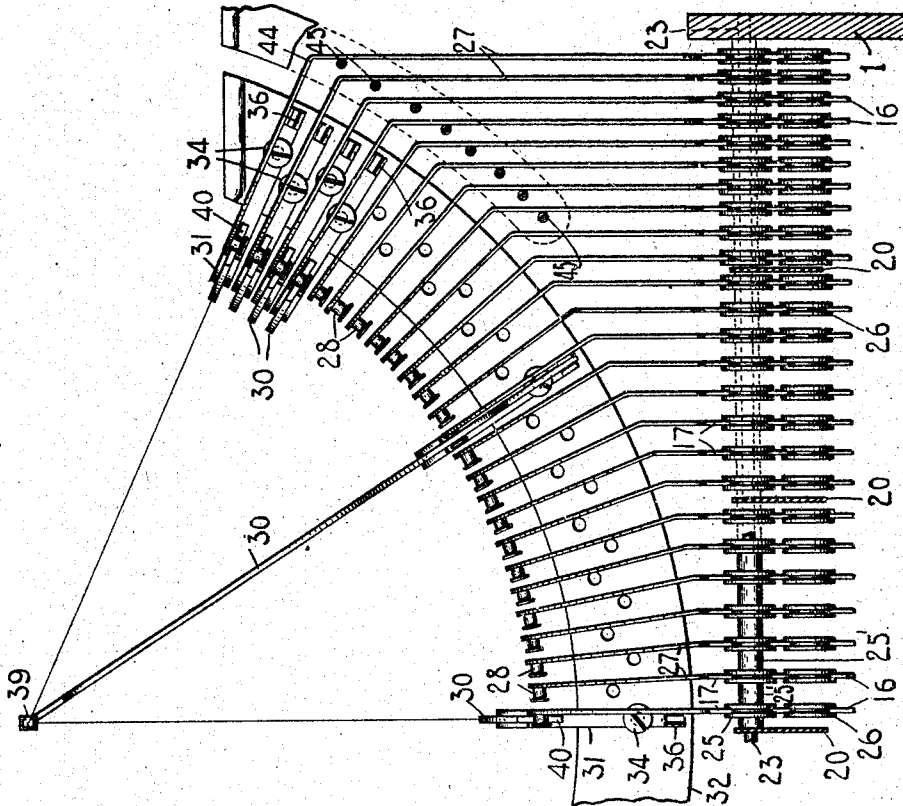


FIG. 3.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## TYPE-WRITING MACHINE.

949,508.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed September 25, 1907. Serial No. 394,501.

*To all whom it may concern:*

Be it known that I, CHARLES E. TOMLINSON, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and it has for its principal object to provide an improved type action for such machines and particularly for front-strike typewriters.

I have provided a type action in which the type bars are thrown to the printing point with a motion, the first part of which is comparatively slow and which motion is continuously accelerated throughout the stroke of the key, and in which the type bars are automatically locked against rebound when they return to normal position. I have also provided an improved type bar and hanger construction and arrangement.

To the above and other ends which will hereinafter appear, my invention consists in certain features of construction and combinations and arrangements of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a front to rear vertical sectional view of a typewriting machine having my invention embodied therein, the platen being shown diagrammatically. Fig. 2 is a fragmentary rear elevation of the left-hand half of the system of type actions, with some of the type bars and hangers omitted. Fig. 3 is a fragmentary plan view of five type bars near the middle of the segment, together with their coöperating parts, the parts appearing as viewed from above and from the rear of the machine. In all of the views parts are shown in section or broken away and parts are omitted.

My invention is applicable to various styles of typewriting machines though it is particularly adapted to "visible" or front-strike machines.

The main frame of the machine shown in the drawings comprises side plates 1 having corner posts 2 cast integral therewith, which corner posts support a top plate 3 above which there is mounted a carriage (not shown) which supports a roller platen 4

diagrammatically shown in Fig. 1. The top plate 3 is of peculiar construction and among other things comprises a part 5 of conical form lying beneath the platen and above the type bar pivots and constituting a dust guard for said pivots.

The printing keys 6 are mounted on the upper ends of stems 7 which are guided in suitable openings in a keyboard plate 8. Each of said key stems is pivoted at its lower end at 10 to an arm 11 of one of a series of bell-crank key levers which are pivoted on transverse rods 12 which are suitably supported in the framework of the machine. Each of the bell-cranks has an arm 13 to which at 14 is pivoted the forward end of an actuating bar, link or device 15 which extends toward the rear of the machine and actuates one of the type bars, these connecting devices 15 being substantially rigid. Said connecting devices or bars may be guided at their forward ends and may be connected with the keys by other means than that shown.

The bars or actuating devices 15 are guided at their rear ends by the following means:—Each of said bars at its rear end is forked, having two branches 16 and 17, one above the other and forming between them a wide open ended slot with parallel bearing edges 16' and 17' respectively. A frame bar 18 extends across the rear of the machine being supported at its ends by the side plates 1, and said frame bar has projecting forward therefrom a number of brackets 20 each of which, as shown in the present instance, consists of a piece of sheet metal bent at right angles to form a flange 21 which is secured to the bar 18 by screws or rivets 22. In Fig. 2 these brackets are shown in section and the bar 18 thus does not appear in said figure. The brackets 20 support two rods 23 and 24, one above the other and each extending across the machine and preferably as shown in Fig. 2 extending through the side plates 1 so that the rods may be removed from and inserted into the machine. The bar 18 and rods 23 and 24 are included in the horizontal slot between the arms 16 and 17 of each of the bars 15 and said rods 23 and 24 have rotatively mounted thereon grooved rollers 25 and 26 respectively, said rollers being spaced apart by washers 25', the lower bearing edge 17' of the arm 17

of each of the bars 15 running in the peripheral groove in one of the upper rollers 25 and the bearing edge 16' of the arm 16 running in the groove of one of the rollers 26. It will be seen that the bars 15 are slidably mounted at their rear ends, the rollers 25 and 26 serving to reduce the friction and the grooves in said rollers guiding the bars against tilting to one side or the other.

Each of the bars 15 has an upstanding arm 27 which at its upper end has a headed pin 28 projecting from one side thereof. The pin 28 may be a shouldered and headed rivet which directly engages the associated type bar, or it may be such a rivet with a roller mounted thereon to reduce friction.

The type bars 30 are pivoted in individual hangers 31 mounted on a type bar segment 32 which is secured by means of screws 33 to the under side of the top plate 3. The hangers 31 are each secured by a screw 34 to the rear face of the segment 32. Each hanger as here shown is formed of one solid piece of metal with its upper end bifurcated to receive one of the type bars which is pivoted to the hanger at 35 and said hanger is formed at its lower end with a centering or guiding device consisting of a rearward projecting arm 36 having in its rear end a crotch with inclined sides into which crotch a tail-piece 37 of the type bar is adapted to enter near the end of the printing stroke in order to guide the type bar and its type accurately to the printing point. The screws 34 are arranged in staggered fashion, as indicated in the drawings, in order to economize space in the segment and the hangers are shaped accordingly. The type bars when in their normal position rest against a segmental pad 38 which is secured in any suitable manner to the framework. In the present construction each of the type bars is furnished with a single type 39 and in order still further to economize the space in the type bar system, I have arranged the type bars and hangers into two sets and have also staggered the pivots of the type bars themselves, setting every other pivot farther toward the rear of the machine than the alternating pivots and effecting a corresponding staggering of the type blocks as indicated in Figs. 1 and 3. I accomplish this in the present instance by making every other hanger thicker in a fore-and-aft direction at the part thereof that is secured to the segment 32, thus throwing not only the pivot 35 of each type bar of one set but also the crotched guiding arm 36 of its hanger farther toward the rear of the machine than the corresponding parts of the type bars and hangers of the other set. By this device I am enabled to get a larger number of segmentally arranged type bars into a comparatively small space in the machine.

The arm or tail piece 37 of each type

bar is slotted or bifurcated to provide a shorter lever arm 40 substantially parallel with the first mentioned arm and an intermediate slot 41 between the two arms and in which the pin 28 of the corresponding bar 15 is adapted to work. This slot 41 has the shape shown in Fig. 1; that is to say, its forward end is a little to the rear of the pivot 35 of the associated type bar and the forward part of said slot is radial of the pivotal center of the type bar and stands normally at a downward inclination toward the rear of the machine, whereas said slot is curved so that at its rear end it is substantially horizontal or at an angle to the radius in which the forward part of the slot is situated.

The construction is such that when a key is depressed the bar 15, and with it the pin 28, moves toward the front of the machine, the forward end of the bar being guided by the lever arm 13 of its bell-crank and the rear end of the bar being guided by its rollers 25 and 26. The pin 28 thus describes a path that is approximately a horizontal straight line directly toward the front of the machine. It will be seen that during the first instant of this motion the pin 28 is moving in a line nearly parallel with the portion of the slot 41 that it occupies at the time, and that the forward part of the slot is curved away from this line. It will also be perceived that in the initial part of the stroke, said pin 28 is at a considerable distance from the pivot 35 of the type bar, whereas at the conclusion of the stroke the pin has moved to a point much closer to said pivot as indicated in dotted lines in Fig. 1. The type bar is thus started with a low velocity relative to that of the pin 28 and of the key, but this relative velocity is continuously accelerated throughout, or substantially throughout, the stroke, the acceleration being due partly to the shape of the slot 41 and partly to the near approach of the pin 28 to the pivot of the type bar. The bars 15 have sliding pivotal connection with the type bars as the relative motion of a pin 28 and a type bar is partly a sliding motion and partly a turning motion. It will also be perceived that when the type bar is in its normal position it is locked against rebound as the direction of the slot 41 at the part thereof that is occupied by the pin 28 is then approximately at right angles to the line of motion of said pin.

The relative motion between the pin 28 and the slotted arm of a type bar, consists partly of a sliding motion and partly of a turning motion. In some of the claims I have accordingly referred to this pin and slot connection as a "sliding pivotal connection." This same relative motion can, of course, be produced by other means than by a pin working in a slot.

As indicated in Fig. 1 those arms 27, the pins 28 of which cooperate with the type bars whose pivots are nearer the front of the machine, are extended at their upper ends so as to bring the pins 28 correspondingly nearer to the front of the machine.

Each of the bars 15 is connected to one end of a returning spring 42 which extends downward and toward the rear of the machine, and at their lower or rear ends said springs are connected to a transverse bar 43 which is supported at its ends by the side plates 1. The springs 42 serve to return the keys and their connections to normal position. In this type action the difference in height or elevation between the type bars near the middle of the segment and those near the ends of the segment may be compensated for in a variety of ways. As shown in the present instance the rear ends of all of the bars 15 are mounted at the same elevation, the rollers 25 and 26 being strung in straight horizontal lines across the machine, and the arms 27 are made of different lengths appropriate to the several type bars. I prefer also to mount each roller 25 vertically above the corresponding roller 26, although it will be understood that this arrangement is not absolutely essential. As the different type bars swing in different planes at different inclinations to the vertical, those arms 27 near the ends of the segment extend for some distance vertically from the bars 15 and thence they are bent at 44, as indicated in Fig. 2, into or substantially into the planes of their respective type bars, the height and sharpness of the bend 44 varying progressively from the center to the sides of the system. The grooved rollers 25 and 26 tend to prevent lateral motion of the upper ends of the arms 27 and these rollers are sufficient in most cases for this purpose, but in the case of a type bar near the end of the segment there would be, when the key was depressed, a pull tending to deflect the arm 27 toward the middle of the machine. In order to resist this tendency each of those arms 27 near either side of the system has mounted by the inner side thereof a supplemental guide in the nature of a stationary horizontal guide pin 45, these pins being fixed to short segments 46 secured to the under side of the top plate 3. In Fig. 2 I have shown eight such pins, but the number may be varied as found necessary or advisable. In Fig. 1 the lowermost three of these pins have been merely indicated by dotted lines in order to avoid obscuring the other parts of the drawing.

Various changes may be made without departing from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combi-

nation of a series of type bars, a series of keys and bell-crank key levers at the front of the machine, and connections between said key levers and type bars comprising a horizontally disposed series of rigid bars or actuating devices connected at their forward ends to said key levers and slidably mounted at their rear ends for motion in a fore-and-aft direction and each having an up-standing arm for operating a type bar, said upstanding arms being of different lengths.

2. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys and key levers at the front of the machine, and connections between said key levers and type bars comprising a horizontally disposed series of rigid bars or actuating devices slidably mounted at their rear ends for motion in a fore-and-aft direction and each having an up-standing arm connected directly to a type bar, said upstanding arms being of different lengths.

3. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys and key levers at the front of the machine, and connections between said key levers and type bars comprising a horizontally disposed series of rigid bars or actuating devices slidably mounted at their rear ends for motion in a fore-and-aft direction and each having an up-standing arm having sliding pivotal connection with a type bar, said upstanding arms being of different lengths.

4. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys and key levers at the front of the machine and connections between said type bars and key levers comprising a series of rigid bars or actuating devices connected at their forward ends to said key levers and having up-standing arms for actuating said type bars, and rollers for guiding the rear ends of said actuating devices.

5. In a typewriting machine, the combination of a series of type bars, a series of keys and key levers and connections between said type bars and key levers comprising a series of rigid bars or actuating devices connected at their forward ends to said key levers and slidably connected to said type bars, and grooved rollers for guiding the rear ends of said actuating devices for motion in a fore and aft direction.

6. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys and key levers at the front of the machine, and connections between said type bars and key levers comprising a series of rigid actuating bars or devices connected at their forward ends to said key levers and having up-standing arms for actuating said type bars, and grooved

rollers for guiding the rear ends of said actuating bars for motion in a fore and aft direction, each actuating bar having two guide rollers one situated above the other.

- 5 7. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys and key levers at the front of the machine and connections between said type bars and key levers com-  
10 prising a series of rigid bars or actuating devices connected at their forward ends to said key levers and having up-standing arms for actuating said type bars, and grooved rollers for guiding the rear ends of said  
15 bars for motion in a fore and aft direction, and supplementary guiding devices for the upper parts of those arms near the sides of the system.

- 20 8. In a typewriting machine, the combination of a type bar having a bifurcated arm with a slot between the branches of said arm, one of said branches being longer than the other, an actuating device working in said slot, and an alining device engaged by  
25 said longer branch.

9. In a front strike typewriting machine, the combination of a type bar segment, a series of individual type bar hangers mounted on said segment, and a series of front  
30 strike type bars pivoted in said hangers, each of said hangers having a centering device and each of said type bars having an arm coöperating with said centering device, said type bars and hangers being arranged  
35 in two sets in staggered arrangement, the hangers of one set being thickened at the parts thereof that are secured to the segment so as to bring the pivot points of the type bars thereon and the associated center-  
40 ing devices farther from the segment than those of the hangers of the other set.

10. In a typewriting machine, the combination of a type bar having a curved slot therein, one end of said slot being approxi-  
45 mately radial to the pivot of the type bar and the other end of the slot being at an angle to a radius in which the other end of the slot is situated, a key, connections between said key and type bar comprising a  
50 part having a pin engaging in said slot, and means for guiding said part in the initial portion of its motion so that said pin moves in a direction approximately lengthwise of said slot.

- 55 11. In a front strike typewriting machine, the combination of a type bar having a curved slot therein, one end of said slot being approximately radial to the pivot of the type bar and the other end of the slot  
60 being at an angle to a radius in which the other end of the slot is situated, a key, connections between said key and type bar comprising a part having a substantially right line motion and having a pin engaging in  
65 said slot, and means for guiding said part

in the initial portion of its motion so that said pin moves in a direction approximately lengthwise of said slot.

12. In a front strike typewriting machine, the combination of a type bar, a key, and connections between said key and type bar comprising a part mounted for motion approximately in a straight line fore and aft of the machine, and a curved slot in said type bar in which said pin engages, the part of said slot in which the pin normally stands  
75 extending approximately fore and aft of the machine and the other end of said slot being approximately radial of the type bar.

13. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys, connections between said keys and type bars including a series of bell crank key levers, and a series of actuating bars pivoted at  
80 their forward ends to said key levers, a transverse frame piece at the rear of the machine, and guiding devices for said actuating bars, said guiding devices being carried by said frame piece and arranged in a straight  
90 horizontal row or rows.

14. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys, connections between said keys and type bars including a series of bell crank key levers, and a series of actuating bars pivoted at  
95 their forward ends to said key levers, a transverse frame piece at the rear of the machine, and upper and lower rollers carried by said frame piece for guiding the rear ends of said actuating bars.

15. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys, and connections between said keys and type bars comprising a series of fore and aft moving bars  
105 15 forked at their rear ends and having upper and lower guide rollers mounted between the branches of the forked ends of said bar.

16. In a typewriting machine, the combination of a type bar, a key, and connections between said key and type bar comprising a sliding actuating bar having a sliding connection with said type bar, a key actuated  
115 lever to which one end of said actuating bar is pivoted, and means separate from the type bar for guiding the other end of said actuating bar, the construction and arrangement of said parts being such that the type bar is locked against rebound in the normal position thereof.

17. In a typewriting machine, the combination of a series of type bars, a series of  
125 keys, key actuated levers at the front of the machine, connections between said key actuated levers and type bars comprising a series of rigid actuating bars slidably mounted at their rear ends for motion fore  
130

and aft of the machine and each of said actuating bars having an upstanding arm for operating the corresponding type bar, and means for connecting said actuating bar with said type bar and locking said type bar against rebound in the normal position thereof.

18. In a front strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of keys, key actuated levers, and connections between said key actuated levers and type bars, said connections comprising a series of actuating bars slidably mounted at their rear ends for motion fore and aft of the machine and each having an upstanding arm connected directly to a type bar, the construction and arrangement of said parts being such that the type bars are locked against rebound in their normal positions.

19. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys, key actuated levers, and connections between said key levers and type bars comprising a series of actuating bars slidably mounted at their rear ends for motion fore and aft of the machine and each having an upstanding arm, said arms having sliding pivotal connections with the type bars to effect an acceleration of the type bars in their movements to printing position, the construction and arrangement of the parts being such that the type bars are locked against rebound in their normal positions.

20. In a front strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of keys, key actuated levers, connections between the said key actuated levers and type bars comprising a series of actuating bars slidably mounted at their rear ends for motion fore and aft of the machine and each having an upwardly extending arm for operating a type bar, said arms being of graduated lengths and the arms at the side portions of the system being bent so that the upper end of each of said arms is approximately in the plane of movement of the corresponding type bar, and means for connecting said actuating bar with said type bar and locking said type bar against rebound in its normal position.

21. In a front strike typewriting machine, the combination of a series of front strike type bars, a series of keys, key actuated levers, and connections between said type

bars and key actuated levers comprising a series of actuating devices connected at their forward ends to said key actuated levers and slidably connected to said type bars, and rollers for guiding the rear ends of said actuating devices for motion fore and aft of the machine, the construction and arrangement of said parts being such that each type bar is locked against rebound in its normal position.

22. In a front strike typewriting machine, the combination of a segmentally arranged series of upwardly and rearwardly striking type bars, a series of keys, and connections between said keys and type bars, said connections comprising a series of radially disposed arms having sliding pivotal connections with said type bars to afford an acceleration of the type bars in their movement to printing positions, and means for guiding said arms for bodily motion fore and aft of the machine, the construction and arrangement of said parts being such that each type bar is locked against rebound in the normal position thereof.

23. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar having a slotted arm, an actuating device for said type bar having a pin that works in the slot in said arm, and means for effecting a straight line movement of said pin to produce an acceleration of the type bar in its movement to the printing position, the parts including means to lock the type bar against rebound in its normal position.

24. In a typewriting machine, the combination of a type bar having a curved slot therein, one end of said slot being approximately radial to the pivot of the type bar and the other end of the slot being at an angle to the radius in which the other end of the slot is situated, a key, and connections between said key and type bar comprising a part having substantially a right line motion and having a pin engaging in said slot, the construction and arrangement of said parts being such that the type bar is locked against rebound in the normal position thereof.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 16 day of Sep. A. D. 1907.

CHARLES E. TOMLINSON.

Witnesses:

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J. A. PROSS.