

Jan. 9, 1923.

C. T. MILLER, JR.  
TYPEWRITING MACHINE.  
FILED JAN. 31, 1920

1,441,237

3 SHEETS-SHEET 1

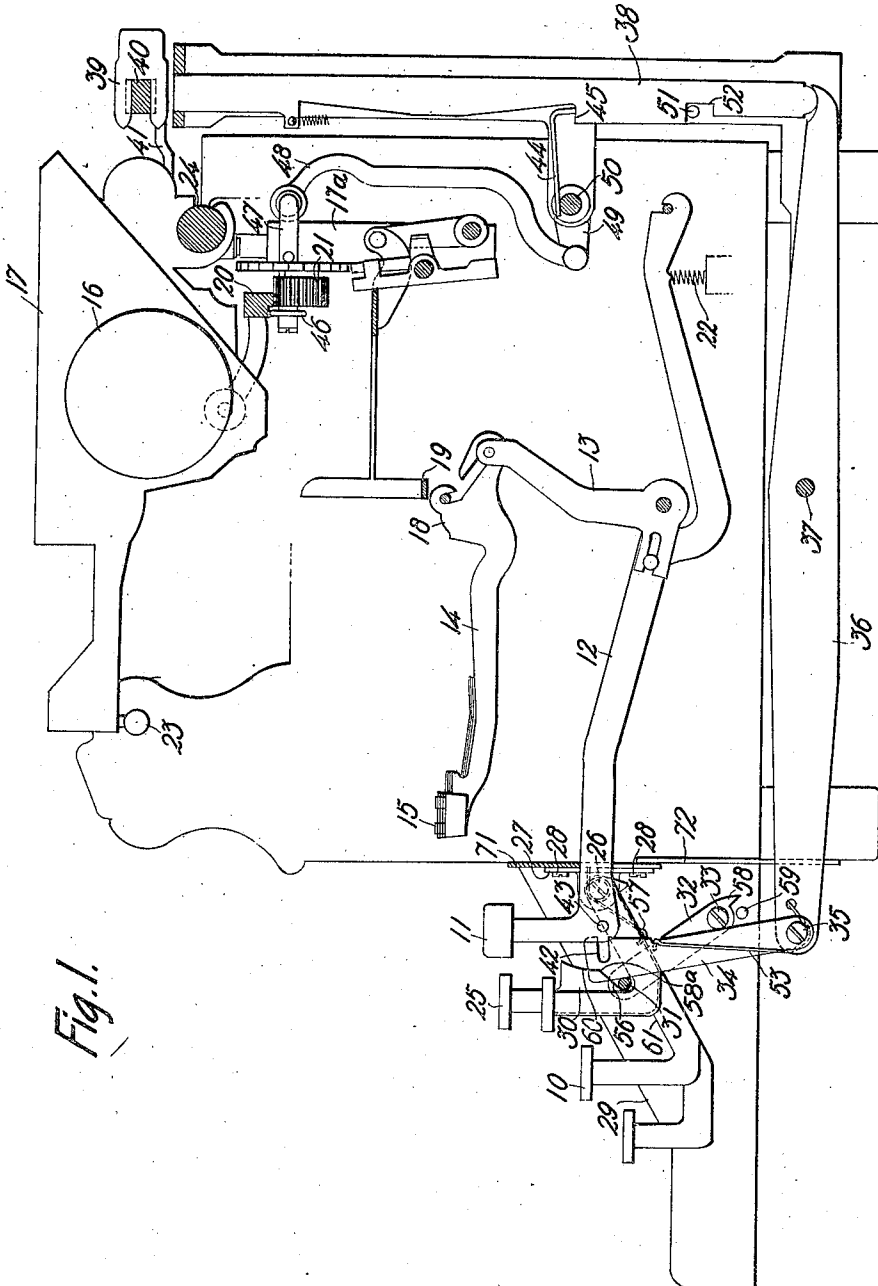


Fig. 1.

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3 SHEETS-SHEET 2

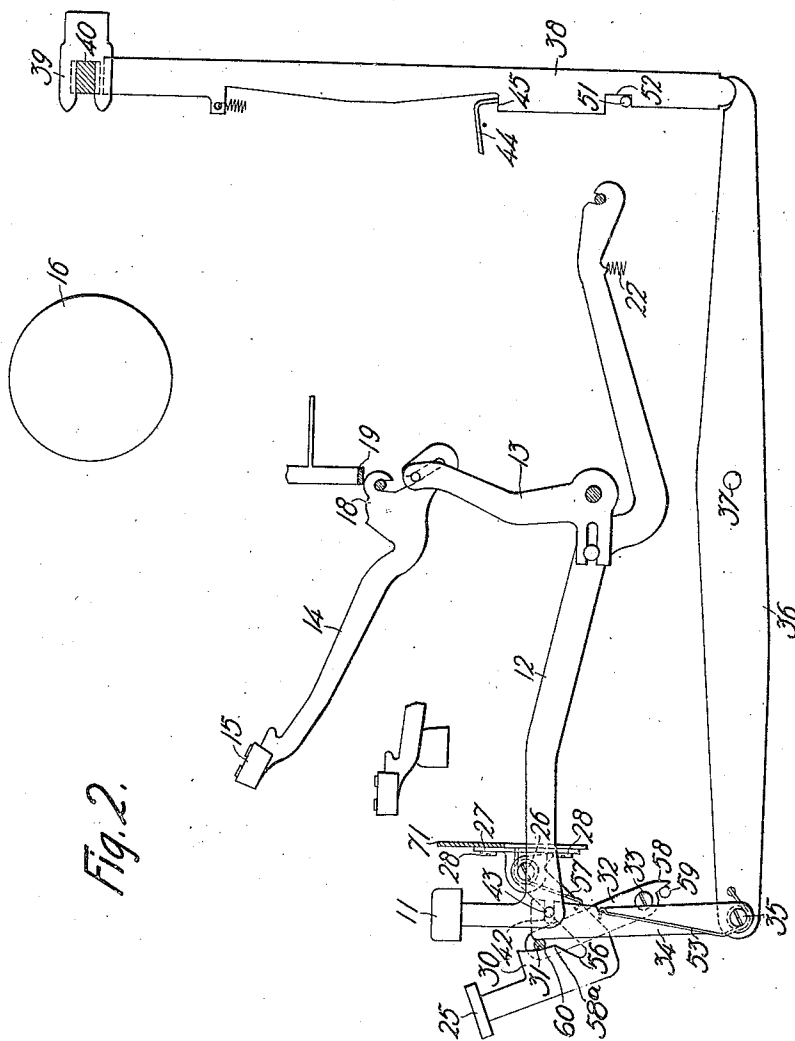


Fig. 2.

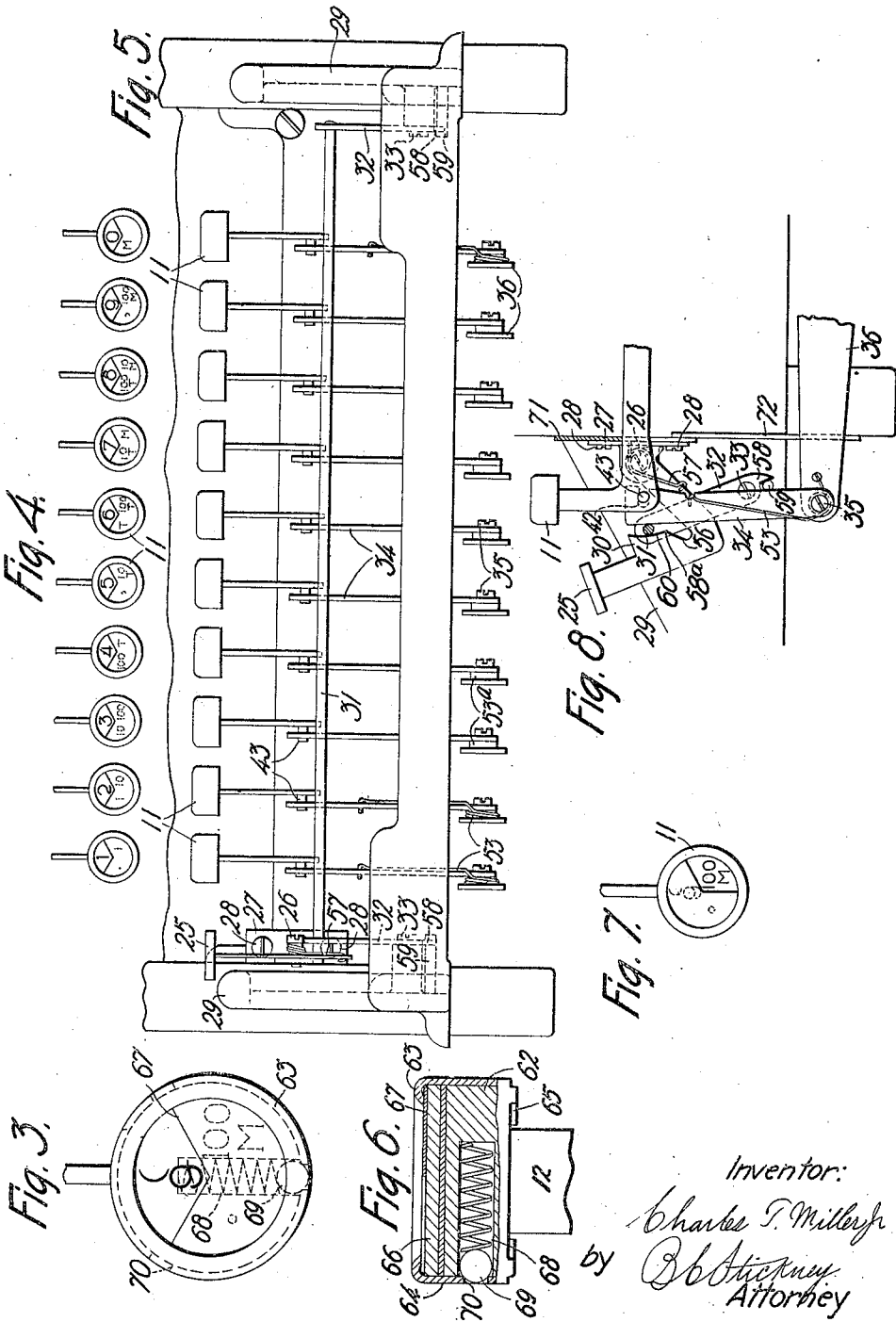
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3 SHEETS-SHEET 3



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# UNITED STATES PATENT OFFICE.

CHARLES T. MILLER, JR., OF BROOKLYN, NEW YORK, ASSIGNOR TO UNDERWOOD  
TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

## TYPEWRITING MACHINE.

Application filed January 31, 1920. Serial No. 355,449.

*To all whom it may concern:*

Be it known that I, CHARLES T. MILLER, Jr., a citizen of the United States, residing in Brooklyn Borough, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to typewriting machines, and more particularly to tabulating devices for such machines, and is herein disclosed as applied to an Underwood standard typewriting machine.

The invention as herein disclosed is a decimal tabulating device which is adapted to be actuated by the numeral keys of the typewriting machine, and is especially adapted to be incorporated in machines of the usual type with the minimum amount of modification or special work. As herein disclosed, the usual decimal stops may be provided with key levers which are slightly shorter than the usual levers, so that said levers, instead of extending to the front of the machine, may terminate substantially beneath the front of the numeral key levers, and are connectible to the latter by normally ineffective connecting devices.

The connecting devices may be in the form of hooks adapted to engage studs on the numeral key levers, one hook being provided for each tabulating stop and corresponding numeral key. The hooks may be normally disconnected from the studs and may be swung into engagement with the studs by a bar which extends across the bank of keys and lies between the numeral bank and the next bank below, thus being out of the way and yet enabling the mechanism to be compact.

The connections may be such that the usual numeral key levers, which print when depressed, are not carried down to the same extent when connected to actuate the decimal stops, with the result that printing is avoided at the actuation of any of said keys in a tabulating operation. The bar which serves to connect the numeral keys to the tabulator key levers may be effective by actuation of a conveniently placed key, which is automatically returned to ineffective position when released.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a diagrammatic sectional side view of an Underwood standard typewriting machine, showing the present invention as applied thereto, the machine being in normal condition for typewriting.

Figure 2 is a diagrammatic side view, showing the position of a numeral key and its associated parts when actuated to make a tabulating stop effective.

Figure 3 is a plan view of a numeral key, showing the numeral legend displayed by the rotatable top, and showing the concealed tabulating legends through the top.

Figure 4 is a plan view of the bank of numeral keys showing the concealed tabulating legends on the keys.

Figure 5 is a fragmentary front view, with many parts omitted, showing the numeral keys and some of the tabulating connections.

Figure 6 is a sectional side view of the key seen in Figure 3.

Figure 7 is a view on a smaller scale, similar to Figure 3, but showing the key top rotated to display one tabulating legend and conceal the numeral.

Figure 8 is a fragmentary side view, showing the connecting key depressed to connect the numeral keys to the tabulating devices.

In the Underwood standard typewriting machine, alphabet keys 10 and numeral keys 11, when depressed, carry down key levers 12, rocking sub-levers 13 to carry type bars 14 upwardly and rearwardly, so that types 15 thereon print against the front side of the platen 16, journaled on a carriage 17. Whenever a numeral key 11 or alphabet key 10 is depressed, it feeds the carriage 17 along the distance of one letter space when released, and for this purpose each type-bar 14 is provided with a heel 18 which actuates a segmental universal bar 19, as the types 15 approach the platen. This actuates the usual escapement device, and permits the usual spring barrel 17<sup>a</sup> to draw the carriage 17 along the distance of a letter space, the carriage for this purpose being provided with a pivoted rack bar 20, which meshes with a pinion 21 connected to the escapement wheel. When a key 10 or 11 is released, it returns to normal position under the influence of its returning spring 22. The carriage 17 travels in the manner described on a front rail 23 and a rear rail 24.

When it is desired to bring the carriage 17 rapidly to a more or less distant letter space in its travel, the tabulating mechanism may be made effective by depressing a 5 finger-piece or connecting key 25 which is pivoted by a shouldered screw 26 on a bracket 27, held by screws 28 to the frame of the typewriter inside of a side member 29 at the end of the keyboard. When the key 10 25 is depressed, a cam 30 on it rides down upon a universal bar or bail 31 which is mounted in arms 32, pivoted to shouldered screws 33 each fast in one of the sides 29.

As the cam 30 descends it rocks the bar 15 31 rearwardly, swinging the connecting hooks 34 rearwardly, because it bears against the front sides of said hooks. Each hook 34 is pivoted by a shouldered screw 35 upon the front end of a decimal-key lever 36 20 pivoted intermediate its ends at 37, and adapted to lift its one of an array of counter-stops 38 into the path of a column-stop 39, adjustably mounted on a rack bar 40, fast to the usual brackets 41 on the typewriter 25 carriage. To enable any hook 34 to carry down its key lever 36 in the manner described, each hook is provided with jaws 42, which, at the depression of the connecting key 25, are adapted to extend over and embrace a stud 43 on its numeral key lever 12, 30 so that the depression of the numeral key will carry down the tabulating lever 36 to make its stop 38 effective.

In order to release the carriage from the 35 pinion 21 to enable it to travel until it is arrested at the proper space by a column-stop 39, when the latter strikes the counter-stop 38, there is provided a carriage release device which may be much of the usual 40 sort and includes a short universal bar 44 overlying heels 45 on the counter-stops 38; said universal bar, when actuated, adapted to lift the rack bar 20 clear of the pinion 21 and allow the spring barrel 17<sup>a</sup> to draw the 45 carriage to the left until arrested by the column-stop 39 striking the raised counter-stop 38. The connections for lifting the rack bar 20 include a roll 46 on the front end of a lever 47 pivoted intermediate its 50 ends and connected by a link 48 to the rock arm 49, fast to the shaft 50, which latter is fast to the universal bar 44. The roll 46 when raised runs on the usual flat margin of the rack bar 20.

It is found that any tabulating lever 36, 55 if pivoted at the usual point, nearly intermediate its ends, will raise its counter-stop 38 to the proper position determined by the usual arresting bar 51, even though the numeral key actuating it is only depressed far 60 enough to raise its type-bar 14 to the Figure 2 position, that is, to a position far short of the platen and short of the point at which the type-bar begins to actuate the universal 65 bar 19.

For limiting the travel of the counter-stops 38, there may be provided notches 52 of much the usual length, thus answering the purpose just described. In order to normally keep the hooks 34 clear of the numeral 70 keys and key levers, each hook is provided with a wire spring 53 which is coiled around a washer 53<sup>a</sup>, interposed between each hook 34 and its lever 36, and normally throws its hook forwardly to the Figure 1 position 75 against the bar 31 in the ineffective position of the latter. The throw of the bar 31 is limited by the end of the cam slot 56 which normally engages the bar 31, since the connecting key 25 is normally held in its upper- 80 most (Figure 1) position, by a returning spring 57, coiled about its pivot screw 26.

To limit the rearward travel of the bar 31, the arm 32, which carries the bar 31, may 85 be provided with a tail 58, which is adapted to engage a pin 59 fixed in the adjacent side frame 29, it being so located that it arrests the bar 31 with the jaws 42 fully engaged with the studs 43, and yet not creating serious friction of the bar 31 on the hooks 34. 90 In order to give the key 25 the right feel to the typist, the cam 30 adjacent the bottom 56 is quite steep, but at a point 58<sup>a</sup> becomes a dwell 60 which holds the bar 31 substantially 95 with the tail 58 against the pin 59.

It is found that the bar 31 may rest against the downwardly sloping portion 61 of the key levers 12 of the alphabet keys 10, and yet bear far enough down on the backs 100 of the hooks 34 to enable the numeral keys 11 to fully depress the hooks without carrying them beneath the bar 31 and beyond its control.

Each numeral key 11, above referred to, is 105 preferably provided with a special body 62 and a top 63, so that the top may be rotated to display the numeral printed by the key, or the decimal place at which the key will arrest the carriage when operated in either 110 of two systems of pointing off numbers. For this purpose, the bodies 62 are made fast to the key levers 12, in any suitable manner, and the rotatable tops 63 include annular rings 64 having lugs 65 which are 115 adapted to be turned under the bodies. The numerals and tabulating data forming the legends for the keys may be printed upon the tops of the bodies 62 and show beneath the glass 66. Above the glass, and fast to 120 the ring 64, may be a shield 67, which covers two-thirds of the top 63 of the body, leaving a segmental opening large enough to display the character printed by the key (as shown in Figure 3), or to display either one of the 125 tabulating device legends (as shown in Figure 7).

In order to detain the cover 67 in position to display any desired legend, the body 62 is provided with an opening 68 containing a 130 spring-pressed ball detent 69, adapted to seat

itself in any one of three depressions 70, so disposed as to hold the cover 67 to display any desired one of the three legends.

The numeral keys 11 are steadied against sidewise movement by the usual comb 71, and, to hold the hooks 34 upright, there is provided a comb 72 for the key levers 36. The fit of the hooks 34 on their screw pivots 35 and washers 53<sup>a</sup> is close enough to ensure their proper co-operation with the numeral key levers 12 and studs 43, even though the studs are short enough to clear the adjacent key levers. The numeral type-bars may include the usual upper and lower-case types, and the key-heads may bear corresponding upper and lower-case designations.

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 traveling carriage and column-stops thereon at the rear, of counter-stops, tabulator-levers for operating said counter-stops, typewriter character-keys, pivots for said levers intermediate their ends, said levers extending forwardly beneath the keys to the front of the machine, and means extending upwardly between said keys for connecting certain of said keys to the front ends of said levers to operate the counter-stops.

2. In a typewriting machine, the combination with a traveling carriage and column-stops thereon at the rear, of counter-stops, tabulator-levers, for operating said counter-stops, typewriter character-keys having key-levers extending to the front of the machine, said tabulator-levers extending forwardly beneath the keys to the front of the machine, studs on the front of certain of said key-levers, hooks pivoted on the front ends of said tabulator-levers extending upwardly between said keys and adapted to engage said studs, and a key-operated bar universal to said hooks to make them effective at will.

3. In a typewriting machine, the combination with a traveling carriage and column-stops thereon at the rear, of counter-stops, tabulator-levers for operating said counter-stops, typewriter character-keys having key-levers extending to the front of the machine, studs on the front of certain of said key-levers, hooks on said tabulator-levers adapted to engage said studs, a spring, for each hook, normally tending to hold it ineffective, and a bar universal to the hooks adapted to make them effective at will.

4. In a typewriting machine, the combination with a traveling carriage and column-stops thereon at the rear, of counter-stops, tabulator-levers for operating said counter-stops, typewriter character-keys, a universal

bar operated by depression of said character-keys but only late in their depression, pivots for said levers intermediate their ends, so that the levers extend forward beneath the keys, means for connecting the levers to the keys at will, and means for limiting the throw of the counter-stops to limit the tabulating throw of the keys to an amount insufficient to operate the universal bar.

5. In a typewriting machine, the combination with a traveling carriage and typewriter keys, of a column-stop on the carriage, a plurality of counter-stops, type-operating levers for said keys pivoted at the rear of the machine and extending to the front thereof, stop-operating levers extending substantially the same distance to the front, devices for connecting the front of the two sets of levers, and means for limiting the throw of the counter-stops to limit the throw of the type-keys to an amount insufficient to enable the types to print their characters but sufficient to completely operate the counter-stops.

6. In a typewriting machine, the combination with a traveling carriage and typewriter numeral-keys, of a column-stop on the carriage, a plurality of counter-stops, type-operating levers for said keys, pivoted at the rear of the machine, and extending to the front of the machine, stop-operating levers extending substantially the same distance to the front, and devices for connecting the front of the two sets of levers, to enable an incomplete throw of a numeral-key to completely operate a counter-stop.

7. In a typewriting machine, the combination with a traveling carriage and typewriter character-keys arranged in banks, of a column-stop for the carriage, counter-stops, devices adjacent said keys for connecting the counter-stops to the keys of one bank, levers for said character-keys, and a bar universal to said devices and lying above the levers but below the keys, and between the banks, adapted to be swung to make the devices effective.

8. In a typewriting machine, the combination with a traveling carriage and typewriter character-keys arranged in banks, of a column-stop for the carriage, counter-stops, devices adjacent said keys for connecting the counter-stops to the keys of one bank, levers for said character-keys, a bar universal to said devices and lying above the levers but below the keys, and between the banks, a key-operated cam adapted to swing the bar to make the devices effective, and a dwell on said cam adapted to hold the bar effective when near the end of its throw.

9. In a typewriting machine, the combination with a traveling carriage and a numeral-printing key, of a column-stop on the carriage, a counter-stop, a lever for operat-

ing said counter-stop, a hook pivoted on the lever adjacent the key, a stud fast to the key adapted to be engaged by said hook, a spring normally holding the hook clear of the stud, a bar against which the hook may rest, a cam adapted to be swung to carry the bar to swing the hook to engage the stud, and a dwell on said cam to hold the bar with the hook engaged with the stud.

10 10. In a typewriting machine, the combination with a traveling carriage and typewriter character-keys arranged in banks, of a column-stop for the carriage, counter-stops, devices adjacent said keys for connecting the counter-stops to the keys of one bank, levers for said character-keys, a bar universal to said devices and lying above the levers but below the keys, and between the banks and adapted to be swung forwardly to make the devices effective, and means for limiting the rearward movement of the bar.

11. In a typewriting machine having keys, the combination with a traveling carriage, of decimal-stops at the rear of the machine, levers extending forwardly, hooks pivoted to said levers, studs fixed to said keys and actuated by the operation of said keys, a bar adapted to swing said hooks to engage said key-operated studs, a spring, for each hook, normally holding it clear of its stud, and a finger-operated cam adapted to move said bar to make the hooks effective, and comprising a dwell to hold them effective.

12. In a typewriting machine, the combi-

nation with a traveling carriage and typewriter character-keys arranged in banks, of a column-stop for the carriage, counter-stops, devices adjacent said keys for connecting the counter-stops to the keys of one bank, levers for said character-keys, a bar universal to said devices and lying above the levers, but below the keys, and between the banks, adapted to be swung to make the devices effective, a frame on which said carriage travels, a side of said frame extending past the banks of keys, a key pivoted on said side, and a cam connected to said key to operate said bar.

13. In a typewriting machine, the combination with a traveling carriage and typewriter character-keys arranged in banks, of a column-stop for the carriage, counter-stops, devices adjacent said keys for connecting the counter-stops to the keys of one bank, levers for said character-keys, a bar universal to said devices and lying above the levers but below the keys, and between the banks, adapted to be swung to make the devices effective, a frame on which said carriage travels, a side of said frame extending past the banks of keys, a cam adapted to throw said bar to effective position, an extension of said cam forming a dwell, adapted to retain the bar at effective position, and a spring-retained key for operating the bar.

CHARLES T. MILLER, Jr.

Witnesses:  
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 EDITH B. LIBBEX.