Feb. 10, 1931. J. A. B. SMITH 1,792,047

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed Oct. 16, 1925 2 Sheets-Sheet 1

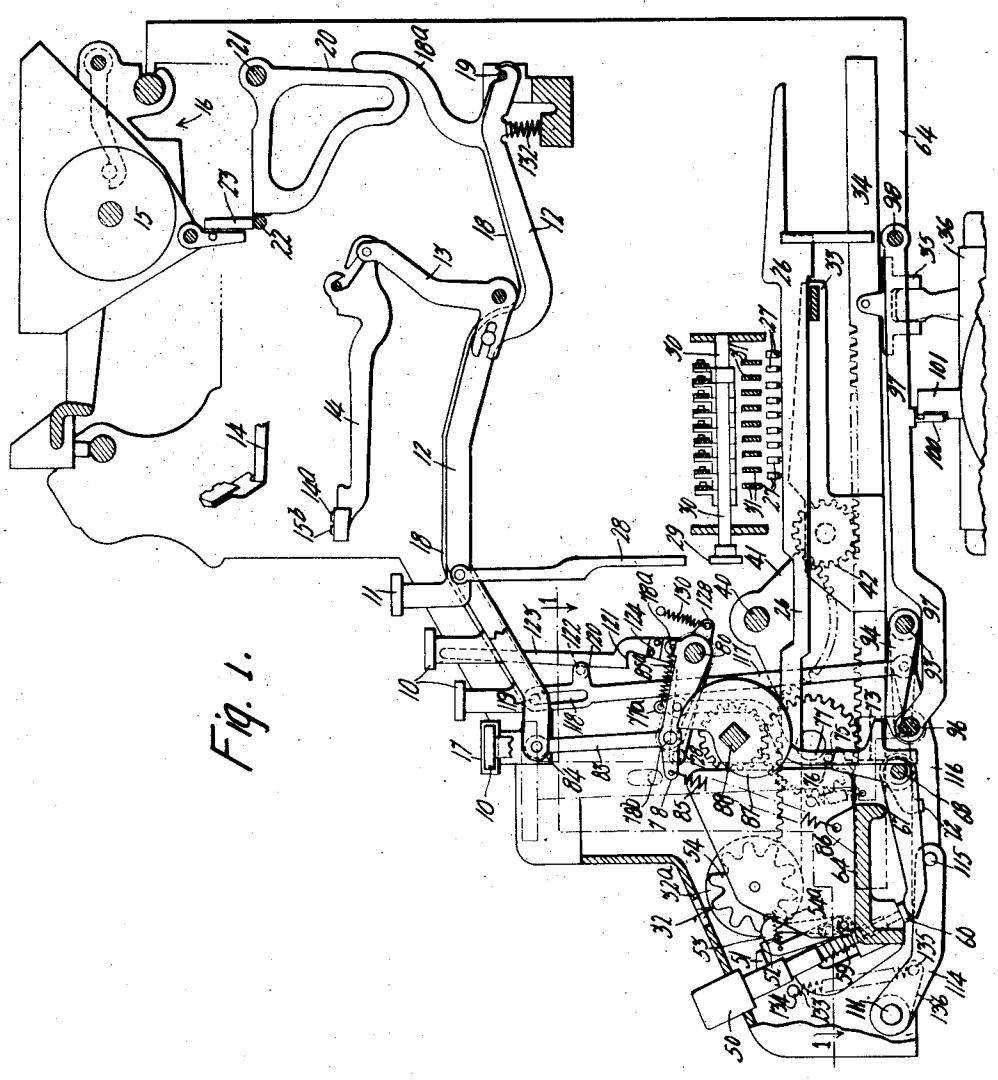


Fig. 1.

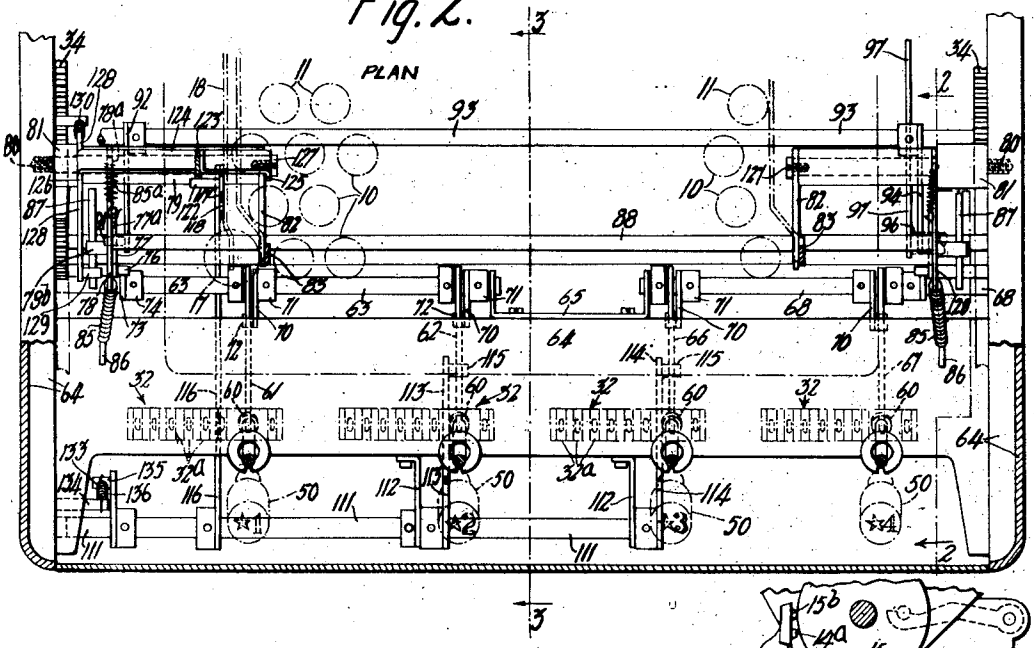
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COMBINED TYPEWRITING AND COMPUTING MACHINE

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Fig. 2.



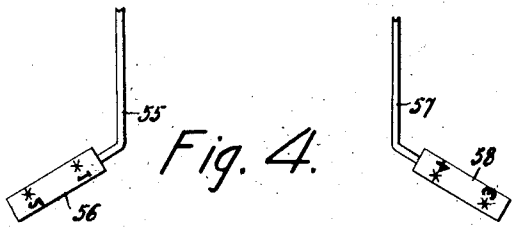


Fig. 4.

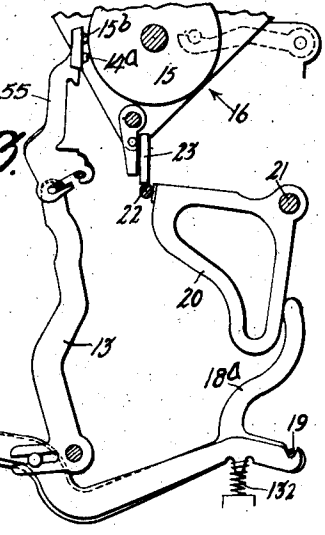
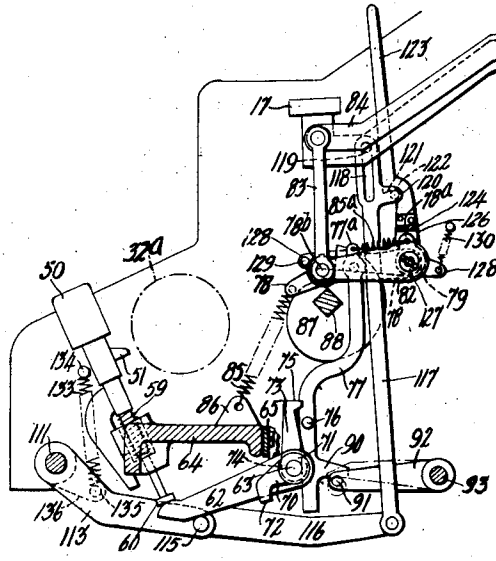


Fig. 3.



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UNITED STATES PATENT OFFICE

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COMBINED TYPEWRITING AND COMPUTING MACHINE

Application filed October 16, 1925. Serial No. 62,734.

This invention relates to combined typewriting and computing machines, and is illustrated in connection with a machine of the Underwood-Hanson type, with which it is the usual practice to type a star-character after a series of figures to indicate that the computation of a group of figures was properly performed.

Certain of said Underwood-Hanson machines are made with a plurality of registers or totalizers, each of which corresponds to a certain computing zone or column on a work-sheet, i. e., is employed for computing figures typed in that column. A star-printing key is usually provided for each register, and is operable only when the register is set correctly at zero, all of the star-keys being connected to operate the type-bar, and print with the same star. It is usual for a star to be typed next to the last numeral of a series of figures to which it relates. At times, however, an operative may inadvertently type the star for a group of zero figures other than the one to which it belongs, and thereby cast doubt upon the correctness of the computing operations involved.

As a safeguard against the confusion which may result from the above-described inadvertence of an operative, provision is made in the present invention of a combined typewriting and computing machine, having type-bars operably connected with the star-keys and arranged for printing a distinguishing character for each register which will be self-identifying, and whose relation to a certain group of figures on a work-sheet will not be in doubt, regardless of its location. Characters descriptive of the registers are illustrated in the present invention by stars with different numerical suffixes. It will be understood that other suitable characters may be used instead of numerals for suffixes.

A feature of this invention includes the addition of two type-bars, one at each side of the segment and each bar having duplicate stars at upper and lower case positions thereof, and each star provided with a suffix in the form of a register-designating numeral, as 1, 2, 3 or 4, each numeral indicating one of the four registers or totalizers of the machine, each star and its register-designating numeral forming a monotype typable at a single stroke of the type-bar and actuated by spring-tensioned connections released by the depression of its star-key, alternate star-keys being operable to jointly release other connections operative to case-shift the platen, and without any attention on the part of the operator, to automatically type upper and lower case register-designating characters according to a predetermined arrangement of the registers and their associated star-keys.

Another feature of the invention assures that though a star-key may be instantly released after it is depressed, its upper-case type will strike against a case-shifted stationary platen. This is accomplished by temporarily latching the platen-shift-lever in its down position to be automatically unlatched immediately after the typing impact.

It will be understood that the present invention is not only applicable to computing machines having a case-shifting mechanism, but may be used to advantage with a variety of other machines, the idea being to appropriate a characteristically distinguishable type for each register, and to provide each register with an independently-operable clearance-sign key under the individual control of the register associated with the key. The distinct clearance-sign appearing on the work-sheet indicates that a certain register in the computing mechanism is clear either before or after a given computing operation.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a fragmentary cross-sectional view of my invention applied to an Underwood-Hanson combined typewriting and computing machine, and is taken along the line 2—2 of Figure 2, looking in the direction of the arrows.

Figure 2 is a fragmentary plan view of the keyboard of the machine shown in Figure 1.

Figure 3 is a fragmentary cross-sectional

view taken along the line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a fragmentary plan view of two outside type-bars having attached thereto type-heads arranged with different upper and lower case monotype characters.

In the usual Underwood-Hanson combined typewriting and computing machines, alphabet-keys 10 and numeral-keys 11 on key-levers 12, when depressed, swing bell-cranks 13 forwardly and type-bars 14 upwardly and rearwardly against a platen 15, so that a type 14^a on the type-bars may print on a work-sheet on said platen, the latter forming a part of a traveling carriage 16. The usual carriage-feeding mechanism (not shown) may be employed for controlling the step-by-step movement of the carriage.

The lower-case type 14^a ordinarily prints on the platen, but, by depressing a shift-key 17 on a shift-lever 18 pivoted at 19, an arm 18^a of the lever is caused to swing upwardly a shift-frame 20 pivoted about a shaft 21, and a rail 22 mounted on the shift-frame engages under a roller 23 pivoted on the carriage 16 and raises the latter, so that upper-case types 15^b may print on the platen. As the carriage is letter-spaced to the lift, it will move, by mechanism described in the patent to Hanson, No. 1,416,464, dated May 16, 1922, computing members or rack-bars 26 seriatim into effective position, so that digit-pins 27 thereon may be set in accordance with the digits written by said numeral-keys 11, each of which, when operated, depresses a pendent member 28 into engagement with an arm 29 on a shaft 30, the latter having a linkage 31 which may swing downwardly to depress its corresponding pin 27; the digit so set up being later carried into computing wheels 32^a which form a register or totalizer 32. This is done by a forward movement of a general operator 33, which includes a rack-bar 34 having fastened thereto a yoke 35 for connection to a motor-driven mechanism 36, such as is described in the patent to J. N. Thornton, No. 1,146,371, dated July 13, 1915. The general operator may also be moved forwardly by a handle (not shown) on a shaft 40 on which is mounted a gear-segment 41, the latter driving the rack-bar 34 forwardly and rearwardly through a pinion 42.

It is usual in the Underwood-Hanson combined typewriting and computing machines to have a star-printing key 50 associated with each register 32, and arranged so that it can be operated only when its register is set at zero. This may be accomplished by providing each of the keys 50 with a lug 51 arranged to be locked by a bail 52 when any wheel of a register 32 is not at zero, the bail being operated by detent-members 53 arranged to be vibrated by gear-wheels 54 of the computing wheels 32^a to position the top of the bail under the lug 51. When all of the computing wheels of a register are in zero position, the detents 53 will enter depressions in the gear-wheels 54 and permit a spring 54^a to pull the bail out of its lug-locking position, as set forth in the patent to R. F. Hoyt, No. 1,256,309, dated February 12, 1918.

In the present invention, four star-printing keys are illustrated, being marked from left to right, "*1", "*2", "*3" and "*4". The *1 and *2 keys 50 are connected with a type-bar 55, which bears a type-head 56 arranged with upper and lower case characters "*1" and "*2", respectively. The *3 and *4 keys 50 are connected to a type-bar 57, which bears a type-head 58 arranged with lower and upper case characters "*4" and "*3", respectively.

The *1 and *2 keys 50 may be depressed against springs 59 and have lower ends 60 of their stems engage against arms 61 and 62 pivoted on a shaft 63, which has its left end mounted in a frame 64 of the machine and its right end mounted in the left arm of a U-shaped bracket 65 fastened to a cross-bar of the frame 64. The *3 and *4 keys 50 may be arranged to depress lever-arms 66 and 67 pivoted on a shaft 68, which may be mounted in the right arm of bracket 65 and frame 64. Short arms 70, having hubs 71 fast on shaft 63, are arranged with transverse end portions 72 bent under the arms 61 and 62. The shaft 63 may have a suitable spring (not shown), which may tend to rotate it clockwise and normally keep the arms 61 and 62 pressed against the lower ends 60 of the keys 50. An upright latch-piece 73, having a hub 74 pinned on shaft 63 adjacent the left end thereof, may have its upper end 75 arranged to normally engage under a pin 76 in a pendent link 77, whose upper end is pivoted to an arm 78, the latter's rear end being fast to a hub-sleeve 79 which is loosely mounted on a stud 80, the latter being screwed into a boss 81 on the left-hand side of the frame 64. At the right end of the sleeve 79 may be fastened a forwardly-extending arm 82, to whose front end is loosely fastened a link 83, whose upper end is loosely fastened to a lever 84 connected through one of the bell-cranks 13 to the type-bar 55. A tensile spring 85 has one end fastened to the front end of the arm 78 and the other end to a lug 86 on the frame 64, and tends to pull the arms 78 and 82 down, and is normally resisted by the latch-member 73 engaging under the pin 76. A tensile spring 85^a has one end fastened to a short upwardly-extending end portion 77^a of the link 77, and the other end fastened to a lug 78^a on the arm 78 adjacent its pivot, and is arranged for holding the lower end of the link 77 in position against the shaft 63, so that the pin 76 will engage on the upper end 75 of the latch 73. The depression of the *1 or *2 key 50, through the means just described, may operate the type-bar 55.

The key-lever 84 may be restored to its normal position upon the rearward travel of the general operator 33, a cam 87 on a carry-over shaft 88 being arranged to engage with a pin 78^b projecting from arm 78 and raise the arms 78 and 82 and the pin 76 to permit the latch-piece 73 to swing under the pin and hold it up in normal position.

For starting the motor-driven mechanism 36, a lug 90 on the lower end of link 77 is arranged to press downwardly on a pin 91 in a lever-arm 92 fast on a shaft 93 to rotate the latter which extends across the frame 64 and is mounted in the sides thereof. An arm 94 may be fastened to the shaft 93 adjacent the right-hand side of the frame 64, the front end of the arm swinging downwardly against a pin 96 in the forward end of an arm 97, whose right end is pivoted about a rod 98 fast to the frame 64. The downward movement of the arm 97 is arranged to rock a pivoted arm 100 and raise a stop-pin 101 of the motor-driven mechanism 36 and cause a motor (not shown) to revolve the mechanism 36, as described in the above-mentioned patent to Thornton.

Upon depression of the *2 and *3 key, the shift-key-lever 18 is caused to be operated before either type-bar 55 or 57 is swung upwardly. Means for accomplishing this result may include a shaft 111 mounted on the left side of the frame 64 and in brackets 112 fastened to said frame, and arms 113 and 114 fastened to said shaft. Pins 115 may be fastened in the free ends of said arms 113 and 114 for engaging under the arms 62 and 66, the latter being depressed by operation of the keys 50, swing the pin-bearing arms 113 and 114 down with them and also a long rearwardly-extending arm 116 fast on the left end of the shaft 111. A link 117 provided with a slot 118 in its upper end arranged for engagement about a pin 119 in the shift-lever 18 has its lower end fastened to the free end of the arm 116 and pulls the shift-lever 18 down when a key 50 is depressed just before latch 73 has been moved out from under pin 76, since the rear end of the arm 116 moves several times faster than the upper end 75 of the latch 73. Provision of the slot 118 permits the shift-lever 18 to be operated by depression of the key 17 in the usual way without affecting the mechanism under control of the keys 50.

It will be noted at Figure 2 that the transmitting of the downward movement of the keys 50 to the shaft 63, through the arm 61, loosely mounted thereon, to the short arms 70 fast on the shaft, permits the key *1 to rock the shaft 63 without affecting the long arm 116 and the platen-shift-lever 18.

The shift-lever 18 may be temporarily latched in its down position for assuring printing of the upper-case characters "*2" and "*3" on the platen while it is stationary. To this end, a lug 120 on the link 117 carries a pin 122 arranged to engage under an angular offset at 121 in an upright spring-pivoted latching arm 123 riveted on a U-shaped bail 124, the latter having an arm 125 pivoted about a shoulder-screw 127 in the end of the stud 80, and another arm 126 pivoted about the inner portion of the same stud adjacent the boss 81, the hub-sleeve 79 being arranged between the arms 125 and 126. The bail 124 may have a forwardly-extending arm 128, which carries a pin 129, arranged to be engaged by the cam 87 upon its rotation by the return movement of the general operator 33, which may swing the arm 128 and the bail 124 against the pull of a spring 130, to release the link 117 from the latch 123 and permit a spring 132 to return the shift-lever 18 to normal position. Mounting the latching arm 123 on the bail 124 permits the arm to be unlatched by the same cam that restores the spring-actuated key-lever 84 to normal position. The link 117 and arm 116 are returned to normal position by a spring 133 which has one end fastened to a pin 134 in the frame 64, and the other end to a pin 135 in an arm 136 pinned to the shaft 111.

Depression of either *3 or *4 key 50 operates the type-bar 57 by means of mechanism mounted near the right side of the frame 64, which is similar to that employed for operating type-bar 55 upon depression of *1 and *2 keys, the carriage 16 being shifted to upper-case position upon depression of *3 key, as described above.

The type-bars 55 and 57 will preferably be placed on the outer edges of the nest of the type-bars 14. This arrangement permits the keyless key-levers 84 to be conveniently arranged outside of the key-levers 12, so as not to interfere with the operation of the usual alphabet and numeral keys. It also permits the register-keys 50, that print upper-case characters, to be positioned in the central portion of the keyboard for convenient connection with the platen-shift-lever 18. It can be readily seen that a greater number of register-keys may be positioned and connected up in a similar way, as described herein, for four keys.

As may be seen from the disclosures herein, in connection with those in the above-noted patents to Hanson and to Hoyt, the characteristics individual to a register may be advantageously employed in different ways. It may be typed adjacent the head of a group of figures, and thereby indicate that the register was properly set at zero before any of the figures were run into it for computation. It may also be typed adjacent the printed result of a computation which has been correctly transcribed from the register in which it was performed.

It will be noted that no change is required in the standard assembly of the indexing wheels of the totalizer, or any addition there-

to, such as a dummy-wheel, to register the clearance state of a plurality of totalizers; that the wheels of each totalizer have individual proof-clearance devices operative to control the actuation of its star-key, but no attempt is made to have the proof-clearance state of one register control the operation of the star-key of adjoining totalizers, by the employment of complicated interlocking mechanisms; that the eyes of the operator are upon the work-sheet, and, should the typed record for a No. 1 totalizer be incorrectly proof-cleared by the star-key of the No. 2 totalizer, the forced automatic typing of a *2 after the typed record in the No. 1 column will be quickly recognized by the operator; and that the monotype typing of distinguishing characteristics which identifies the totalizer and the computive state of the totalizer accomplishes, by a single key manipulation, what heretofore has required separate manipulations of two dissimilar keys, and further eliminates any possibility of error in separately typing the two dissimilar characters.

Variations may be restored 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 combined typewriting and computing machine, the combination with computing registers and keys individual to the registers, of a type-bar, a lower-case and upper-case group of printing characters mounted on said type bar, each of said groups descriptive of a certain one of said registers, and means controlled by the key associated with each register to print the group of characters corresponding to said register, said means including a platen-shift-lever of said machine, interponents arranged for pulling down said shift-lever, and interponents arranged for swinging the proper type-bar against the platen of said machine immediately after the depression of said shift-lever.

2. In a combined typewriting and computing machine, the combination with a platen-shift-lever and a computing register, of a key to denote the computative state of said register, a lever system controlled by said key and arranged for depressing said shift-lever, a latch arranged for holding the depressed shift-lever, power means controlled by the depression of said key for unlatching and restoring said shift-lever and printing means also controlled by said key.

3. In a combined typewriting and computing machine having a shiftable platen, a plurality of computing registers, depressible clear signal keys associated with the registers, one key for each register, a numeral type bar having lower-case and upper-case characters, each character designating a different register, means associated with the keys pertaining to one register to print only upper-case characters, said means including a platen-shift mechanism, interponents for operating the shift mechanism upon depression of a clear signal key associated with a register indicated by an upper-case character, means for locking the shift mechanism in its shifted position during printing of an upper-case character, and means for automatically releasing the lock at the conclusion of the operation of said printing means.

4. In a combined typewriting and computing machine, the combination with registers and a key individual to each of said registers, of a type-bar operably controlled by both of said keys, upper and lower case groups of characters carried by said type-bar, and trains individual to said keys arranged to cause said type-bar to print that one of said groups of characters which is individual to the register with which the operated key is associated.

5. In a combined typewriting and computing machine, the combination with a platen-shift-lever and a computing register, of a key to indicate the computative state of said register, a lever system operable by said key to actuate means connectible to depress said shift-lever, a self-latching means for holding the depressed shift-lever, automatic power-driven means for unlatching and restoring said shift-lever, and automatic printing means controlled by said key.

6. In a combined typewriting and computing machine, the combination with a platen and a computing register, of a type-bar having upper-case monotype characters, a key to indicate the computive state of said register and operable when depressed to release means arranged for moving said platen to upper-case typing position, means for holding said platen temporarily in upper-case position after said key has been depressed and immediately released, and other means actuated by the depression of said key operative to swing said upper-case (monotype) characters against the shifted platen.

7. In a combined typewriting and computing machine, the combination with a computing register, a printing lever, a star-clearing key to indicate the state of said register, and a platen-shift-lever, of means to pull said shift-lever down during depression of said star-key, a latch arranged for holding said shift-lever when depressed, means set in operation by complete depression of said star-key for depressing said printing lever immediately after the latching of said platen-shift-lever, and automatic means for unlatching said platen-shift-lever and restoring it to normal position.

8. In a combined typewriting and computing machine the combination with two registers and a star-key for each register to indicate that the computing wheels of the register stand at zero, of a type-bar having upper and

lower case register-distinguishing characters, means controlled by one of said keys to type one of said characters, and means controlled by the other of said keys to type the other character.

9. In a combined typewriting and computing machine, the combination with a plurality of computing registers, of a type bar carrying a lower-case type associated with one of said registers and a different upper-case type associated with another of said registers a different clearance-printing key for each register, means to place the printing of one of said types under the control of one key, and means to put the printing of another of said types under the control of another key, a case-shifting mechanism being controlled exclusively by the last-mentioned key.

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