Dec. 6, 1927. 1,651,740

B. C. STICKNEY

TYPEWRITING MACHINE

Filed Oct. 30, 1922 7 Sheets-Sheet 1

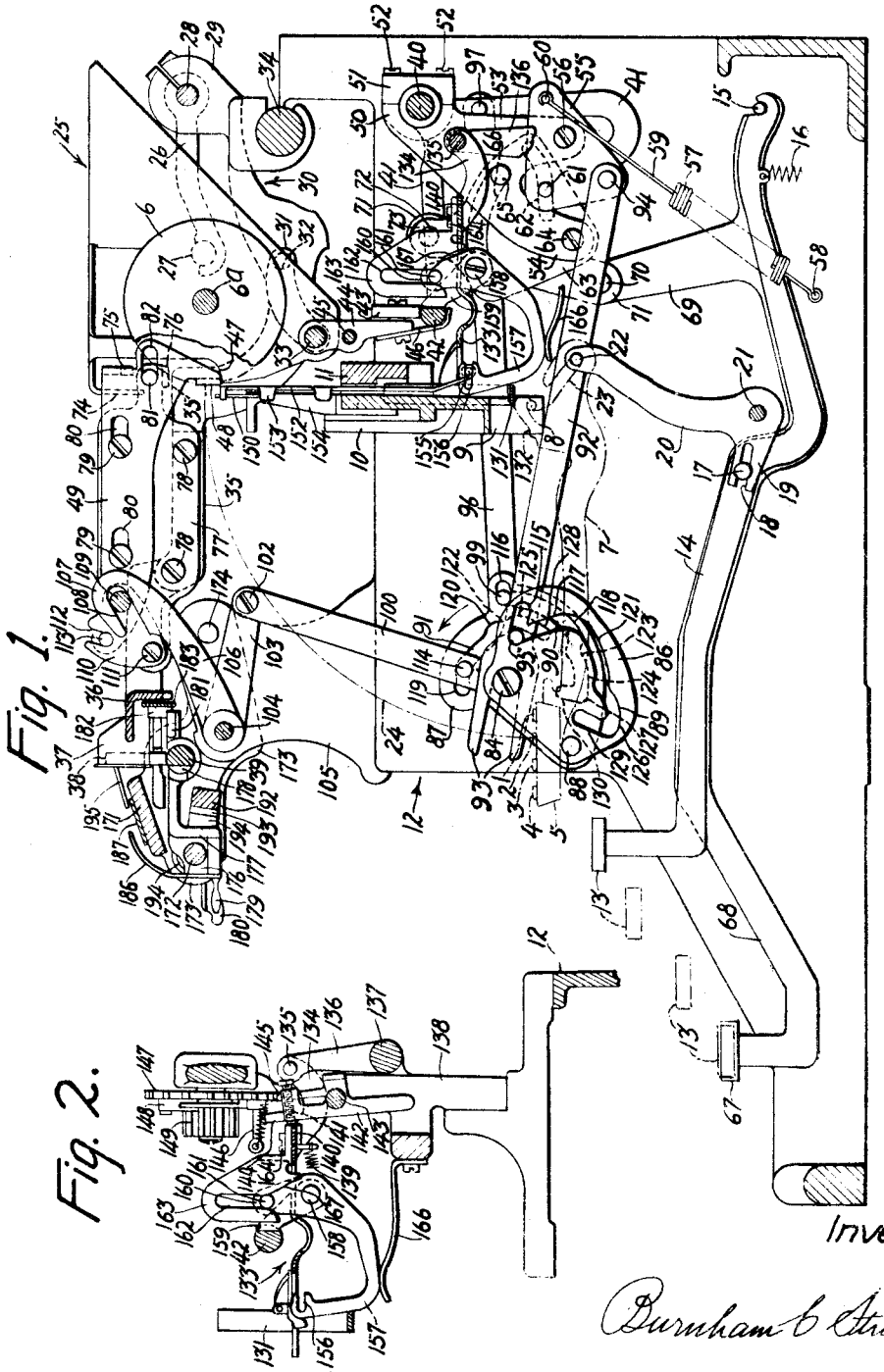

Fig. 1.

Fig. 2.

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TYPEWRITING MACHINE

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Fig. 3.

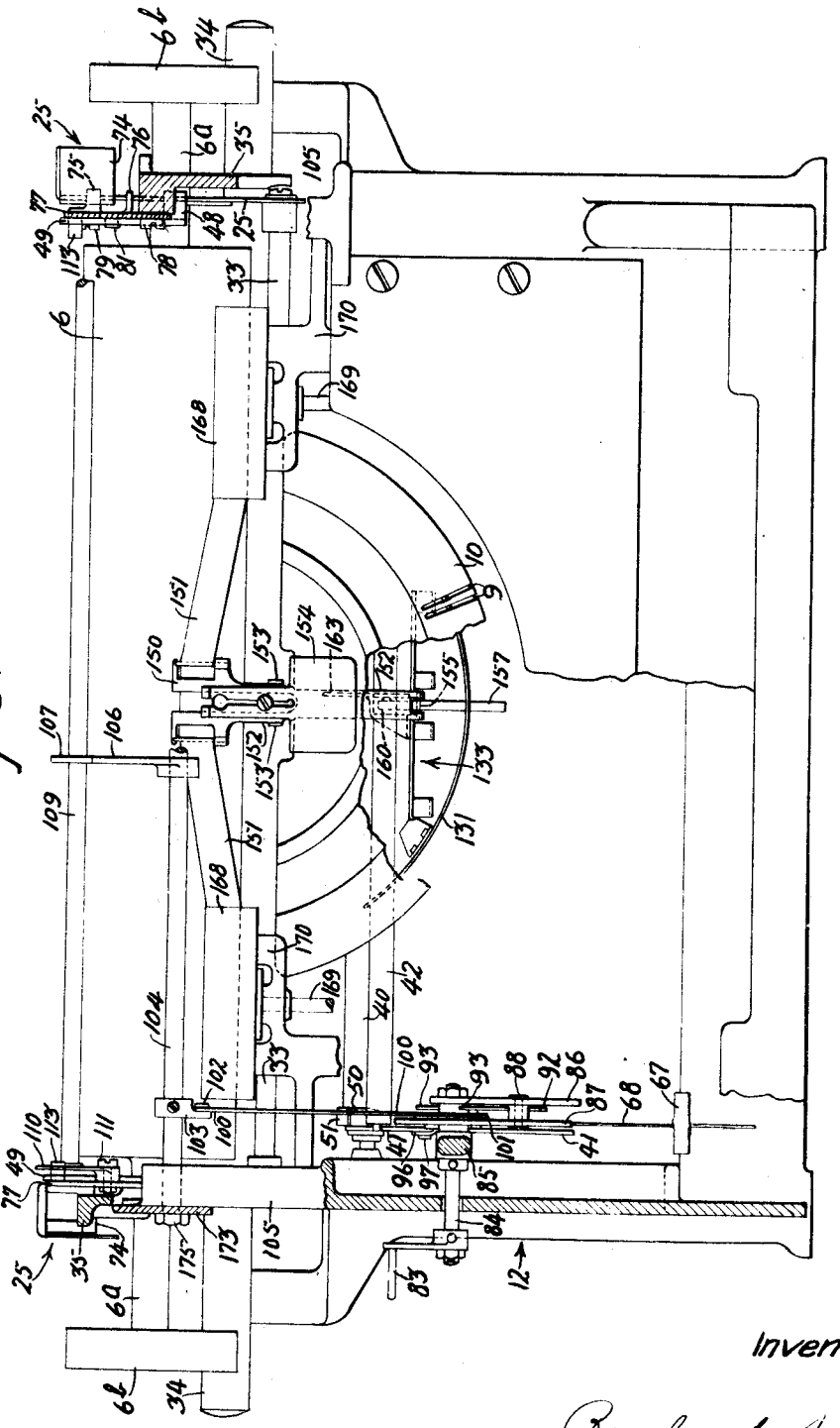

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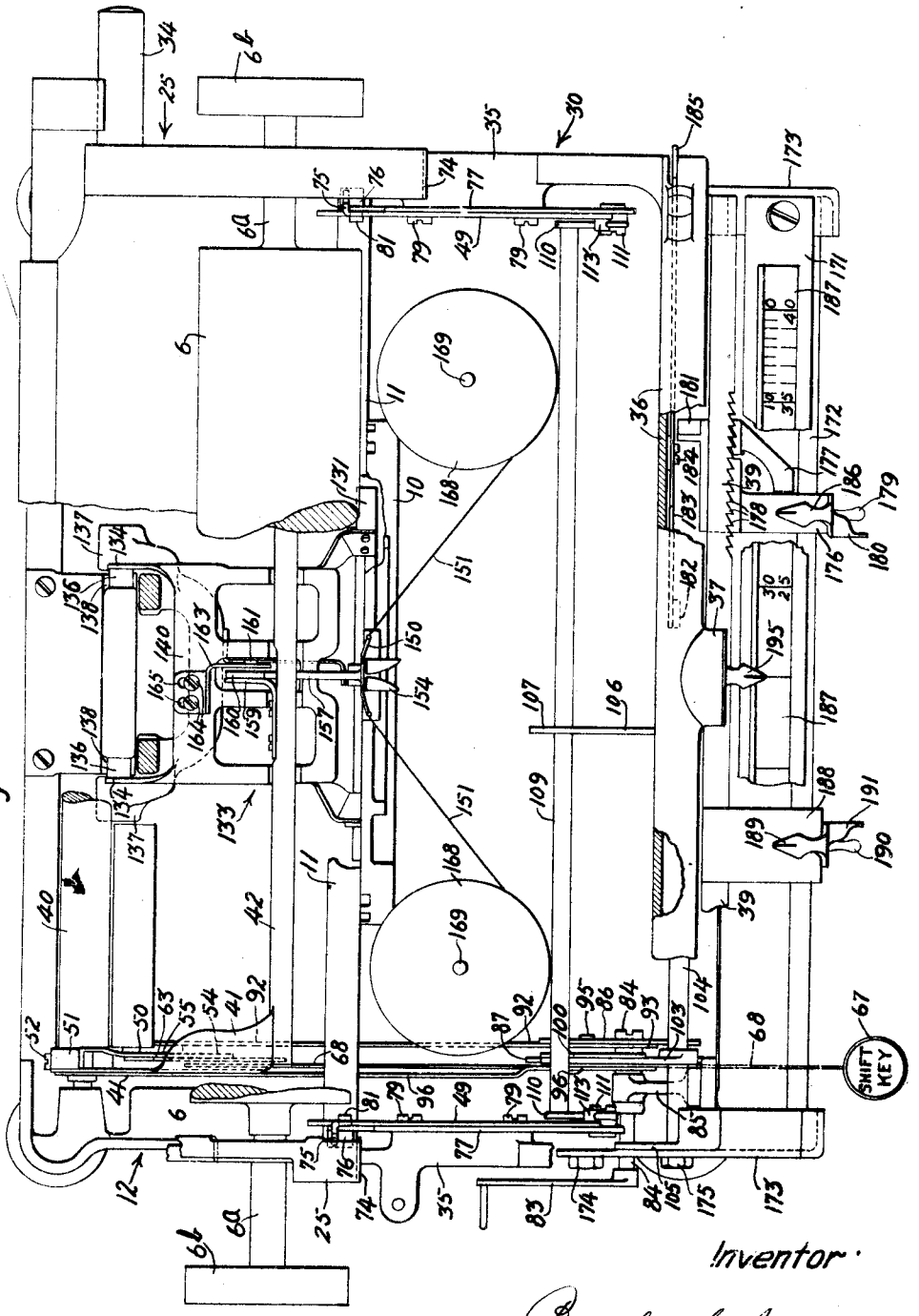
Fig. 4.



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B. C. STICKNEY

TYPEWRITING MACHINE

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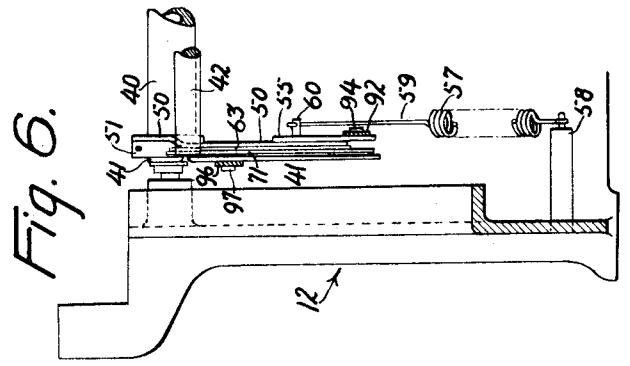

Fig. 6.

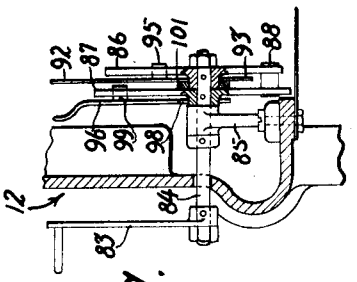

Fig. 7.

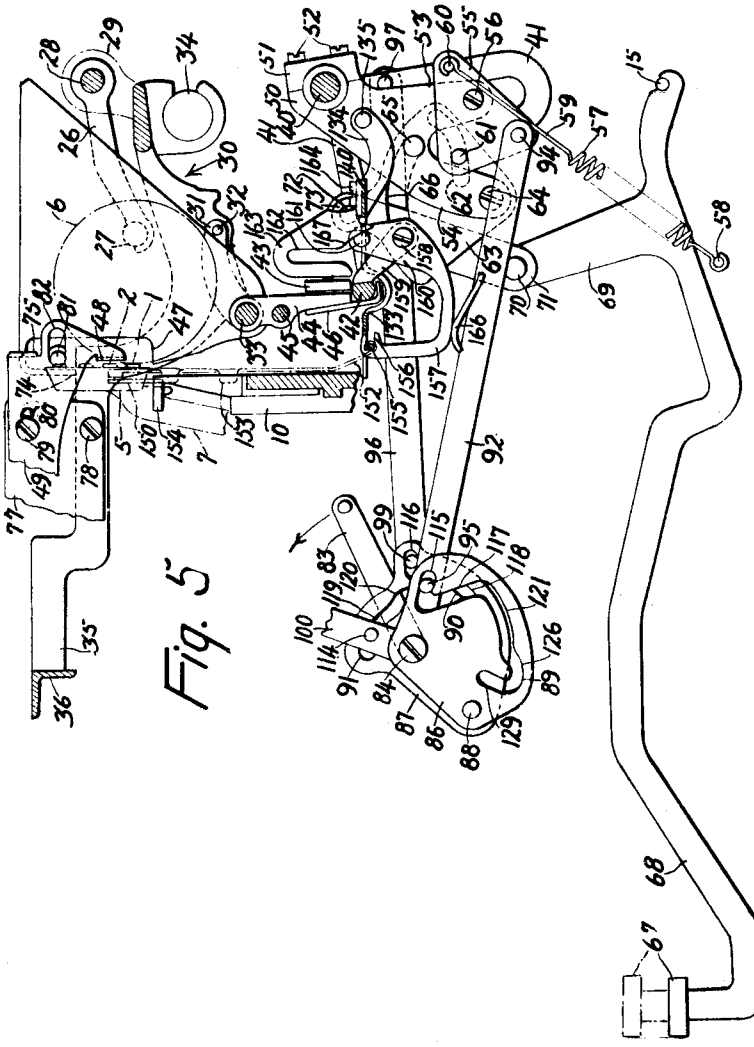

Fig. 5

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Fig. 9.

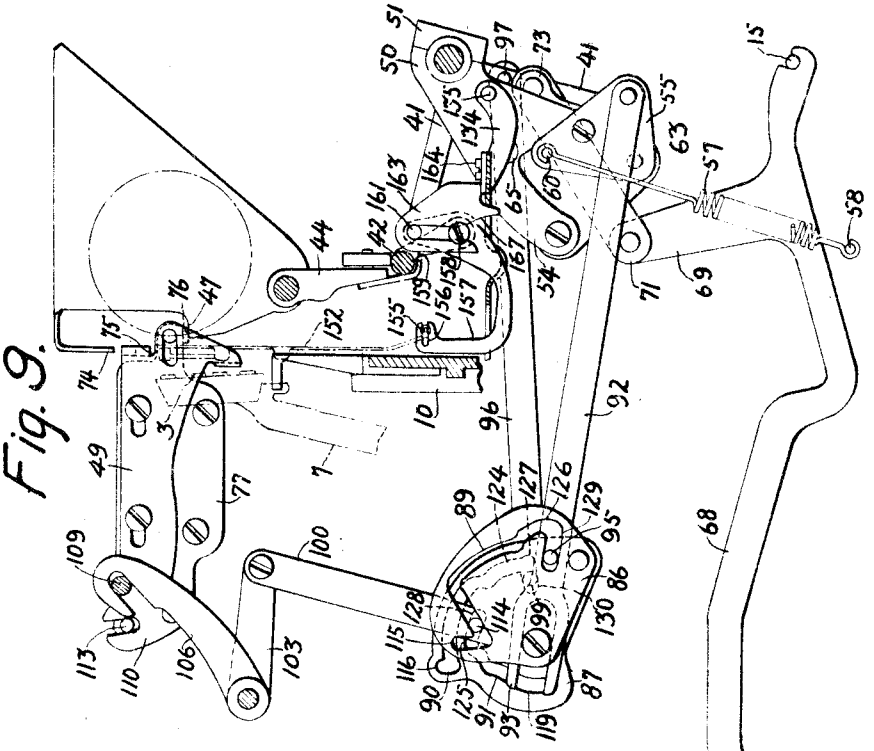

Fig. 8.

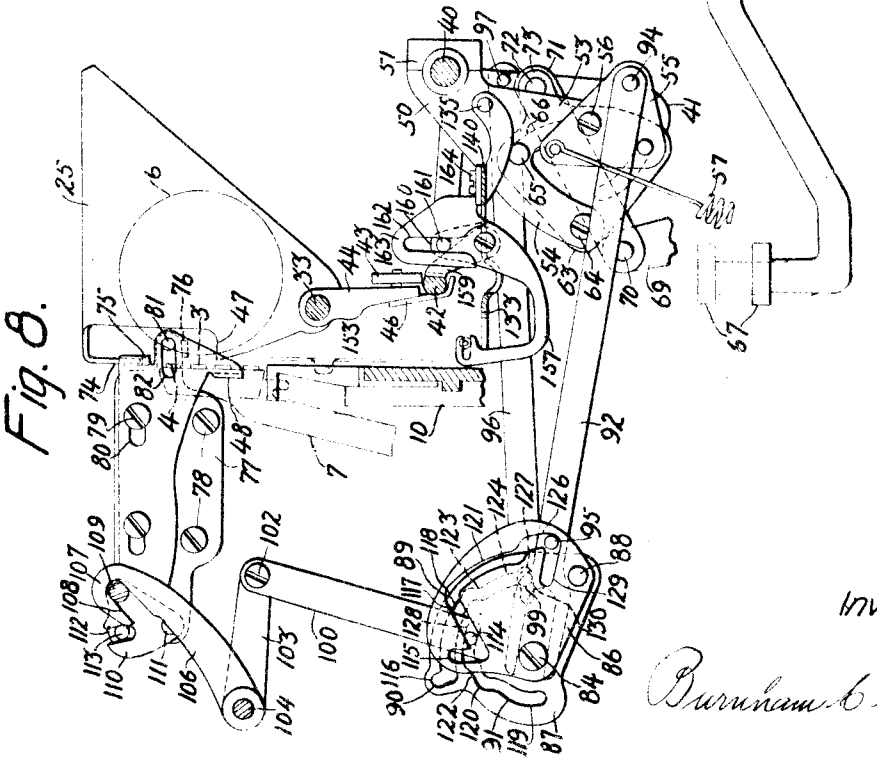

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Fig. 11.

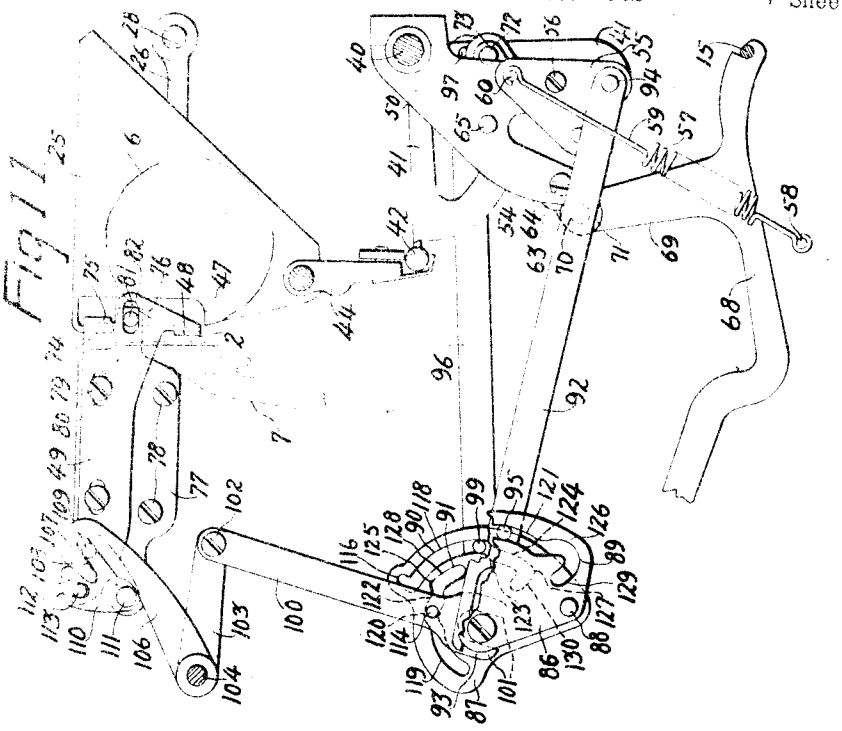

Fig. 10.

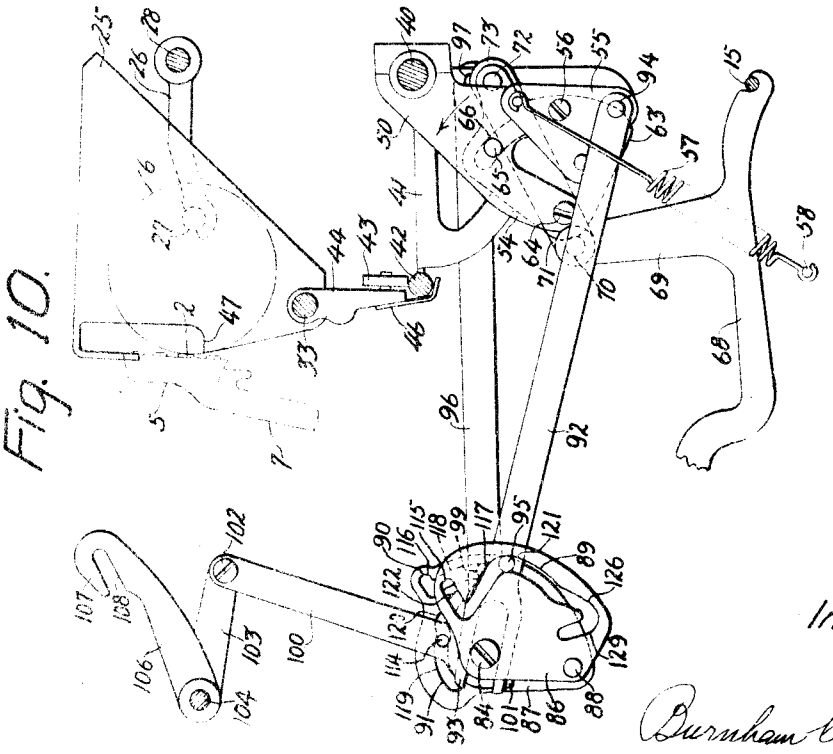

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Fig. 13.

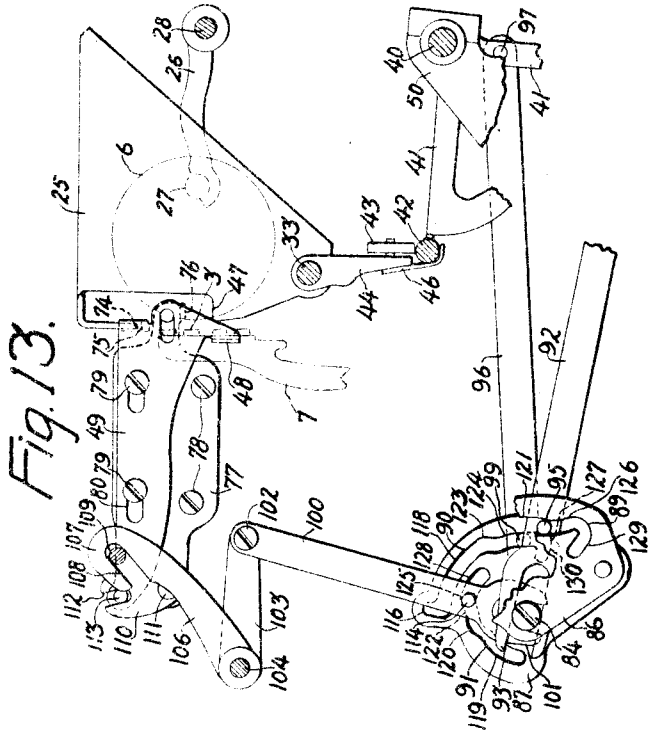
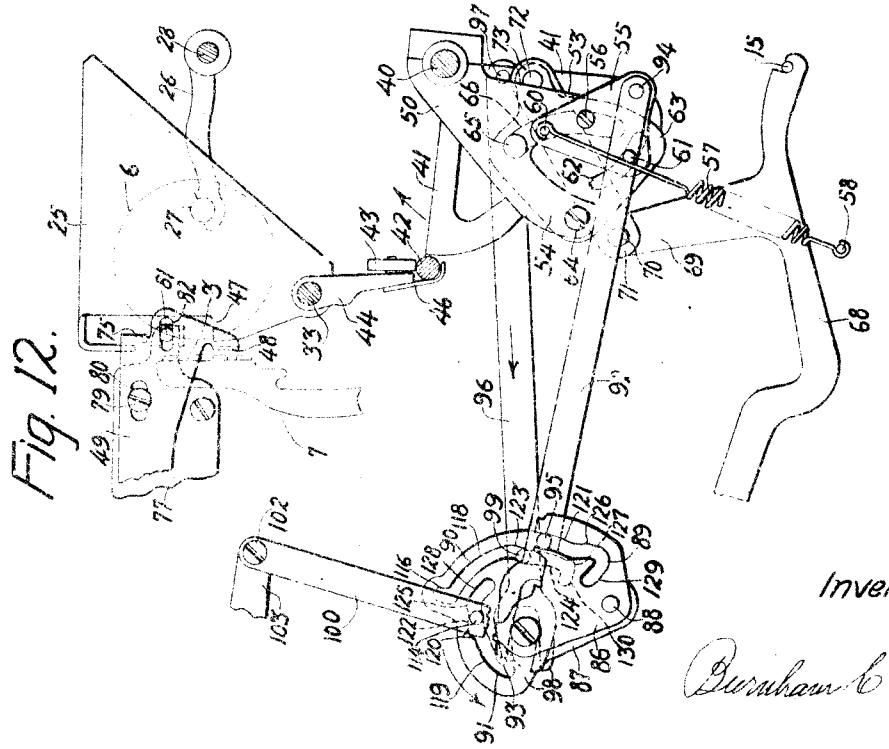


Fig. 12.



Inventor:

Burnham & Stickney

Patented Dec. 6, 1927. 1,651,740

UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF RUTHERFORD, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING MACHINE.

Application filed October 30, 1922. Serial No. 597,756.

This invention relates to front-strike type-bar typewriting machines of that class known as double machines, being provided with two independently or separately usable sets of types.

One of the several objects of the invention is for producing a double typewriting machine by making only slight alterations or changes in a usual single-shift front-strike type-bar machine, such as the Underwood standard typewriting machine, upon which the present invention is an improvement. Another object of the invention is to produce a double typewriting machine, having means for bringing into use either of two sets of types, to the exclusion of the other set, together with means for case-shifting between lower-case and upper-case characters of each set, which is simple in construction, effective in operation and inexpensive to manufacture, and more particularly along the general lines of, and embodying the advantages of, the usual Underwood standard typewriting machine.

In one form, the present invention comprises a double machine having a set of front-strike type-bars, in which each type-bar is provided with two sets of types related, each set of types comprising lower-case or small-letter types and upper-case or capital-letter types, means being provided for selectively bringing into use either one or the other of the type-sets while the other type-set is not used, and means being provided for case-shifting from lower-case to upper-case for whichever of the type-sets may be in use. Some of the main features of the invention may, however, be used for other purposes, as the invention is not limited to independent and distinct sets or gamuts of types.

According to the illustrated embodiment of the present invention, the substantially usual type-bar segment is not shiftable or movable, while the platen is vertically movable or settable to two different normal positions corresponding, respectively, to the lower-case types of one of the sets of types and to the lower-case types of the other set of types, means being provided for case-shifting the platen between lower-case and upper-case characters corresponding to the setting of the platen for using either one or the other of the sets of types.

In carrying out the present invention, four types are arranged in a series longitudinally upon each type-head, the two lower or inner types belonging to a lower or inner set of types, and the two upper or outer types belonging to an upper or outer set of types, and each set comprising related type-faces such as upper and lower case letters. In the first normal position of the platen the platen-frame is lifted and held up against a stop by means of a platen-restoring spring, to hold the platen in position for typing with the second type in the series from the bottom, which may be the lower-case type in the lower set of types, and a shift-key is provided to shift the platen-frame downwardly, against the tension of the platen-restoring spring, against another stop, so that in this lowered case-shift position of the platen it will be in a position for typing by means of the first type in the series, which will be the upper-case character of the lower set of types, and, when the shift-key is released, the platen-frame will be returned by the platen-lifting or platen-restoring spring upwardly, and is limited by the stop against which it was previously held by the spring. Typing may continue with the two types of the lower set of types by merely operating the type-keys and the shift-key in the usual way.

In order to type by means of the types of the upper set, of which the third type in the series from the bottom is the lower-case type, and the fourth type the upper-case type, a setting device or converter mechanism is employed. The converter mechanism includes a single handle or finger-piece movable in one direction or the other between two limiting positions. The converter mechanism also includes means for changing the connection of the platen-restoring spring so that it will not lift the platen upwardly, and which finally changes the connection of the platen-restoring spring to a position in which it will slightly assist gravity in pulling the platen downwardly. The converter mechanism also includes platen-setting

means for repositioning or moving the platen upwardly from its first normal position to the second normal position, corresponding to the third type in the series, which will be the lower-case type of the upper type-set, the platen being held at its second normal position against suitable stops by gravity and by the slight downward pull of said platen-restoring spring. The converter mechanism also includes means for changing the connection of the single shift-key, so that, when the shift-key is operated, with the platen set for typing by means of the lower-case types of the second set of types, the platen-frame will be raised from its second normal position of rest to a final or uppermost case-shift position, for typing by means of the uppermost or upper-case types of the upper type-set, and, upon the release of the shift-key, will drop back again to its second normal position for typing by means of the lower-case types of the upper type-set. The said converter mechanism also includes means for moving, at the proper time, a pair of stop-carrying slides, each of which carries a plurality of movable stops engageable by shoulders provided on the platen-frame, in order, in combination with fixed stops, to stop and hold the platen at any one of its four different positions. After the shifting or setting of the converter mechanism, typing may take place in the usual way, by means of the usual type-keys and by the use of the same shift-key that was used before. Merely by moving the single finger-piece of the converter mechanism in the other direction throughout the extent of its movement, the machine will be reset for typing as before, by means of the lower-case and upper-case types of the lower type-set.

The invention also includes improvements in the ribbon-vibrating mechanism, and in means provided so that the extended four-type type-bars will clear the front rail, upon which the carriage travels, and its associated parts.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a substantially central, front to rear, vertical section of a typewriting machine embodying the present invention, with the platen and other parts of the machine in their normal positions for typing with the second type from the bottom in the series of four types on each type-bar, this type being a lower-case type of the lower set of types on each type-bar.

Figure 2 is a detail front to rear vertical sectional view, showing the escapement mechanism and ribbon-vibrator.

Figure 3 is a front elevation of the machine, partly in section, and with parts omitted.

Figure 4 is a similar plan view of the machine.

Figure 5 is a view similar to Figure 1, showing the platen case-shifted downwardly through one case-shift space, thereby to bring into use the first or lowermost type, which is the upper-case type of the lower set of types, the platen being automatically spring-returned upwardly to its normal position for typing by means of the second or lower-case type of the series when the shift-lever is released, as shown in Figure 1.

Figure 6 is a detail front view showing the parts of the converter mechanism which are connected to the shift-rail frame, in order to enable typing to be done by the third and fourth types, which belong to the second set of types, as shown in Figures 8 and 9.

Figure 7 is a horizontal sectional detail of the actuating device of the converter mechanism.

Figure 8 is a view similar to Figure 1, but showing the converter mechanism as operated, to reposition the settable platen to a second normal position for typing by means of the third type in the series, which is the lower-case type of the second series of types.

Figure 9 is a view similar to Figure 8, in which the platen has been case-shifted upwardly through one case-shift space or distance, so as to type by means of the fourth type in the series, which is the upper-case type of the second or upper set of types, the platen automatically returning downwardly to its second normal position for typing with the third or lower-case type in the upper set of types, as shown in Figure 8, when the case-shift key is released.

Figures 10, 11, 12 and 13 are side elevations showing successive stages or positions of the various parts in converting the machine from the condition shown in Figure 1 to that shown in Figure 8.

The typewriting machine embodying the present invention shown in the drawings is generally of the construction and similar in operation to the standard Underwood single-shift typewriting machine. The principal feature of the present invention resides in the employment of a setting device or converter mechanism, to be hereinafter described, for transforming or converting the machine from a single-shift machine for using one set of types to a single-shift machine for using a second set of types. All of the four types 1, 2, 3 and 4 are arranged in a row or series longitudinally along an extended type head or block 5. The types 1 and 2 belong to the first or inner set of types, of which the type 2 is the lower-case or small-letter type, and 1 is the upper-case or capital-letter type; while the types 3 and 4 belong to the second or outer set of types, the type 3 being the lower-case or small-letter type,

and the type 4 being the upper-case or capital-letter type. Only one of these sets of types is usable at a time, dependent upon the position of the platen 6, as determined by means of said converter mechanism, as will hereinafter appear.

The type-action of the machine shown in the drawings is substantially the same as that of the standard Underwood single-shift typewriting machine. Each type head or block 5 is carried upon the free end of an upwardly and rearwardly swinging type-bar 7, there being about as many type-bars 7 in the set as are commonly employed in the standard Underwood or other single-shift typewriting machine. The type-bars 7 are pivoted, below the printing point, upon an arcuate fulcrum-wire 8, and are guided in usual radial guide-slots 9 formed in a substantially usual type-bar segment 10, which carries the fulcrum-wire 8. The type-bar segment 10 is arranged vertically and is stationarily supported at its top upon a usual cross-bar 11, secured at its ends to the main frame 12 of the machine. Type-keys 13 are carried on the forward ends of key-levers 14, pivoted at their rear ends upon a cross-rod 15 in the main frame 12, each of said type-keys being raised or returned to its normal position by a usual spring 16. Each key-lever 14 carries a stud 17, engaging in a slot 18 provided in a short forwardly-extending arm 19 of an upstanding sub-lever or bell-crank lever 20 pivoted at 21 and carrying a stud 22, engaging in a slot 23 in the type-bar 7. The operation is the same as in the standard Underwood typewriting machine.

In carrying out the present invention, the set of type-bars is not shiftable, the type-bar segment 10 being stationarily or non-shiftably mounted in the main frame 12, as hereinbefore described. However, the usual platen 6 is settable and shiftable up and down to four different positions corresponding to the four types 1, 2, 3 and 4. One of these positions corresponds to the normal position for one of the types of one of the sets of types, from which the platen is shiftable to print with the other type of the same set of types, the platen being movable or settable from its first normal position to the second normal position for printing by means of one of the types of the second set of types, and then being shiftable from this second normal position to a position for printing by means of the remaining type of the second set of types.

In Figure 1, the platen is shown in its first, normal position, for typing, without case-shifting, by means of the type 2, which is the small-letter or lower-case type of the inner set of types 1 and 2, and as is indicated by the arcuate broken line 24. In Figure 5, the platen 6 is shown as case-shifted downwardly through one case-shift space or distance in order thereby to bring into use the type 1, which is the capital-letter or upper-case type of the inner set of types 1 and 2, and as is indicated in Figure 5 by the upraised type-head 5.

In Figure 8, the settable platen 6 is shown as repositioned or moved upwardly, by means of the hereinbefore-mentioned converter mechanism, through one case-shift space or distance from the first normal position shown in Figure 1, to a second normal position for typing, without case-shifting, by means of the type 3 which is the small-letter or lower-case type of the outer set of types 3 and 4, and as is indicated by the upraised type-head 5. In Figure 9, the platen 6 is shown as case-shifted upwardly through a single case-shift space or distance, from the reset position thereof shown in Figure 8, in order thereby to bring into use the type 4 which is the capital-letter or upper-case type of the outer set of types 3 and 4, and as is indicated in Figure 9 by the upraised type-head 5.

The usual platen 6 is journaled upon an up-and-down settable and shiftable platen-frame 25, by means of a platen-axle 6a provided at its ends with usual handle-knobs 6b. In its up-and-down movements the platen-frame 25 is guided by means of forwardly-extending arms 26, which at their forward ends engage studs or gudgeons 27 on the platen-frame 25, and which at their rear ends are fixed upon a rock-shaft 28, journaled in ears 29 formed upon a traveling carriage 30, substantially as is usual in the Underwood machine. The platen-frame 25 is further guided in its up-and-down movements by means of a pair of links 31 pivoted at their rear ends to the carriage 30 at 32, and at their forward ends pivoted upon a cross-rod 33 forming a part of the platen-frame 25.

At its rear, the carriage 30 is mounted to travel on a rear rail 34 mounted upon the the main frame 12. The carriage 30 further comprises end pieces 35, which, at their forward ends, carry a front bar 36, which, at its middle, carries a housing 37 in which is journaled a roller 38 to travel upon an upper front cross-bar or front rail 39, mounted upon the main frame 12.

To provide for vertically repositioning or resetting the platen 6, from one to the other of either of its normal positions, and also for vertically case-shifting the platen away from each of its normal positions, a shift-rail frame is provided, comprising a rock-shaft 40 journaled at its reduced ends in the rear of the upper part of the main frame 12, and having fixed thereon similar forwardly-extending side plates 41, which, at their forward ends, carry a shift-rail 42, upon which runs a roller 43, journaled upon a stud-screw 44 supported upon the [illegible]

frame rod 33, and further supported by a second transverse platen-frame rod 45, a usual bent guide-member 46 being carried by the bracket 44 to engage beneath the shift-rail 42 to assist in maintaining the roller 43 thereon, and also to enable the shift-rail 42 to exert a downward pull upon the platen-frame 25.

First there will be described the means involved in the operation of typing by means of the first or inner set of types 2 and 1, as shown in Figures 1 and 5: next the means involved and the operation thereof for typing with the second or outer set of types 3 and 4, as shown in Figures 8 and 9; and then there will be described the means involved, including the converter mechanism, for transforming the machine from the condition thereof shown in Figure 1 to that shown in Figure 8, successive intermediate positions of the movable parts between Figures 1 and 8 being consecutively shown in Figures 10, 11, 12 and 13. It should be observed, however, that this outline of the following description cannot be strictly adhered to, by reason of the interengaging and interacting relation of the different parts of the machine. Finally, the remaining parts or features of the machine involved in the present invention will be described.

The platen 6 is held at its first normal position, as shown in Figure 1, for typing, without case-shifting, by means of the small-letter or lower set of types 2 of the first or lower set of types, by means, now to be described, for yieldingly pressing the platen-frame 25 upwardly to cause a shoulder 47, one upon each end of the platen-frame 25, to abut against the lower side of a stop 48 carried by a stop-carrying slide 49, which forms a part of the converter mechanism, there being a similar stop-carrying slide 49 at each side of the machine. Near one side of the machine, shown as the left, a shift-frame-operating arm or lever 50 is rigidly, but adjustably, mounted upon the shift-frame rock-shaft 40 by means of a clamp 51 held by screws 52, to clamp the lever 50 upon the hub of the adjacent end plate 41 of the shift-rail frame. The operating lever 50, which is rockable as a unit with and forms a part of the shift-rail frame, extends generally downwardly and forwardly, and, at its lower end, is bifurcated to form a rear prong 53 and a front prong 54. A substantially triangular spring-positioning or spring-setting plate 55, forming a part of said converter mechanism, is pivoted near its center by means of a screw 56 to the lower end of the rear prong or arm 53 of the shift-frame-operating lever 50. A platen-restoring spring 57 is anchored to the adjacent side of the main frame 12 by means of an inwardly-projecting stud 58, and extends at an inclination rearwardly and upwardly, and has an upper straight portion 59 passing below and to the rear of the pivot-screw 56 and pivotally connected at 60 to the rear and upper corner portion of the triangular plate 55, so as to have a tendency, in the position of the parts shown in Figure 1, to rock the triangular plate 55 upon its fulcrum-pivot 56 in a clockwise direction; but, as shown in Figure 1, the triangular plate 55 is locked against such rocking movement by reason of a pin or stud 61 carried by the forward corner of the plate 55 having a locking engagement in an inclined or non-radial slightly-curved slot 62 provided near the rear edge of a substantially sector-shaped platen-shifting plate 63, which also forms a part of said converter mechanism, the plate 63 being pivoted by means of a screw 64 to the forward prong or arm 54 of the operating lever 50. The platen-restoring spring 57, acting through the slot-engaging pin 61 carried by the plate 55, has a tendency to rock or rotate the sector-shaped plate 63 in a counter-clockwise direction on its fulcrum-pivot 64. Such rotation is prevented by means of pin or stud 65 carried by the operating lever 50, projecting into an arcuate slot 66 in the upper part of the plate 63, so that, when the rear end of said slot 66 abuts against the pin 65, as shown in Figure 1, both of the plates 55 and 63 will be locked against rotative movement on their respective fulcrum-pivots 56 and 64, so that thereby the platen-restoring spring 57, which, in the condition of the machine shown in Figures 1 and 5 is a platen-lifting spring, will have a tendency to rock the shift-frame-operating lever 50 together with the plates 55 and 63 as a unit, in a clockwise direction to lift the platen-frame and hold the stop-shoulders 47 thereon against the stops 48.

In order to bring into use the upper-case or capital-letter types 1, of the first or inner set of types, a temporary case-shift-key 67 is depressed, as shown in Figure 5. The case-shift-lever 68 for the shift-key 67 is pivoted at 15, and forward of its pivot is provided with an upstanding shift-frame-operating arm 69, the upper end of which is pivotally connected at 70 to the lower end of an inclined link 71, which at its upper end is pivotally connected at 72 to a lug 73, forming a part of the sector-shaped plate 63 at the top thereof, it being noted in Figure 1 that a straight line passing through the pivot-points 70 and 72 of the link 71 passes to the front of the pivot-point 64 of the plate 63, and also to the front of the shift-rail-frame rock-shaft 40.

When the shift-key 67 is depressed, the downward and forward pull of the link 71 will retain the rear end of the arcuate slot 66 in the sector-shaped plate 63 in engagement with the pin or stud 65, carried by the

shift-rail-frame-operating lever 50. Also, by reason of the fact that the platen-restoring or platen-lifting spring 57 exerts a forward and downward pull along a line passing below and to the rear of the pivot-point 56 of the triangular plate 55, as shown in Figures 1 and 5, the pin 61 carried by the plate 55, engaging in the inclined slot 62 in the sector-shaped plate 63, will prevent independent rotative movement of the plate 55, and will also assist in maintaining the rear end of the arcuate slot 66 in the sector-shaped plate 63 in engagement with the movement-limiting pin 65.

It will now be clear that, when the shift-key 67 is depressed, as shown in Figure 5, the sector-shaped platen-shifting plate 63, the triangular spring-positioning or spring-setting plate 55, and the shift-rail-frame-operating lever 50 will all move together as a unit to rock the shift-rail-frame rock-shaft 40 in a counterclockwise direction against the tension of the platen-lifting spring 57, at the same time lowering the shift-rail 42 to shift the platen 6 downwardly through one case-shift space or distance, for bringing into use the upper-case or capital-letter types 1 of the first or inner set of types, as shown in Figure 5, the downward case-shift movement of the platen being limited by means of downturned shoulder-forming portions 74 on the ends of the platen-frame 25, which abut against the upper sides of the end pieces 35 of the carriage 30, these carriage ends 35 forming fixed stops.

When the shift-key 67 is released, the platen-restoring or platen-lifting spring 57, through the intermediary of the shift-rail frame and other parts hereinbefore described, will lift the platen-frame 25 to restore the platen 6 to its first or lower normal position, and, at the same time, will raise the shift-key lever 68 to restore the shift-key 67 to normal position, as shown in Figure 1, the shift-key operated lever 50 and the converter-mechanism plates 55 and 63 all rocking together as a unit to raise the shift-rail 42.

In the second or upper normal position of the platen 6, shown in Figure 8, for typing, without case-shifting, by means of the small-letter or lower-case types 3 of the second or outer set of types, the second or upper platen-frame stop-shoulder 74 rests upon a second or upper stop 75 carried by the forward end of the stop-carrying slide 49, which has been shifted by the converter-mechanism to bring the upper platen-frame-stop 75 into use, while at the same time the lower platen-frame-stop 48 has been withdrawn out of the path of the first stop-shoulder 47 on the end of the platen-frame 25.

In the converted condition of the machine, shown in Figure 8, the converter mechanism, by means of the shift-rail frame, has lifted the platen-frame 25 to enable the upper or movable platen-frame-stop 75 to be moved into position to be engaged by the upper stop-shoulder 74 on the platen-frame. Also the converter mechanism has been effective to rock the triangular spring-positioning plate 55 in a counterclockwise direction upon its pivot 56. Inasmuch as, as hereinbefore described, the shift-rail frame and the operating arm 50 rock together as a unit, the clockwise rocking of the operating arm 50, combined with the clockwise rocking of the triangular spring-positioning plate 55 thereon, has changed, and has moved forwardly, the pivotal connecting point 60 of the platen-restoring spring 57, so that now this spring exerts a downward pull along a line passing to the front of the plate-pivot 56, and also passing to the front of the axis of the shift-rail-frame rock-shaft 40, instead of to the rear of these pivot-points, as shown in Figure 1, so that, in the converted condition of the machine, as shown in Figure 8, the platen-restoring spring 57 has ceased to be a platen-lifting spring, and instead exerts a slight downward pull upon the shift-rail 42, thereby assisting gravity in holding the upper platen-frame stop-shoulder 74 firmly down upon the upper movable stop 75, as is clear from Figure 8. The counterclockwise rotative movement of the triangular spring-setting or spring-positioning plate 55 upon its pivot 56 has been effective, through the engagement of the pin or stud 61 in the inclined slot 62 of the sector-shaped platen-shifting plate 63, to rock the latter in a clockwise direction upon its fulcrum-pivot 64. The counterclockwise rocking movement of the triangular plate 55 is limited by reason of the plate-pin 61 reaching the outer end of the slot 62 in the plate 63, and the clockwise rocking movement of the latter is limited by the pin 61 in the slot 62 and also, and more effectively, by the engagement of the forward end of the arcuate slot 66 in the plate 63 with the stop-pin 65 carried by the operating lever 50, as is clearly shown in Figure 8.

By reason of the locked condition of the plates 55 and 63, just described, the spring 57 will act upon these plates and the operating arm 50 as a unit. The counterclockwise rocking of the sector-shaped platen-shifting plate 63 has been effective to swing the upper pivotal connection of the shift-key-operated link 71 rearwardly and downwardly, so that a straight line joining the two pivot-points 70 and 72 of the link 71 passes below the fulcrum-pivot 64 of the plate 63, and also below the axis of the shift-rail-frame rock-shaft 40, as shown in Figure 8, instead of at the front thereof, as shown in Figure 1.

In order to bring into use the upper-case or capital-letter types 4 of the second or outer set of types, the single temporary

shift-key 67 is depressed, as shown in Figure 9. The depression of the shift-key 67 exerts a forward and slightly downward pull upon the link 71 along the line passing below the axis of the rock-shaft 40 and also below the pivot-point 64 of the plate 63, so that the plates 63 and 55 will be maintained in their locked condition to move as a unit with the operating arm 50, whereby the latter will be rocked in a clockwise direction to raise the shift-rail 42 for shifting the platen 6 and platen-frame 25 upwardly through one case-shift space or distance, at which the upward movement of the platen-frame is limited by reason of the stop-shoulders 47 thereon abutting against a third or intermediate and fixed stop 76 carried by the rear end of a plate 77 stationarily secured by means of screws 78 to the inner side of the adjacent carriage-end 35. The stop-carrying slide 49 is supported and guided, for rearward and forward sliding movements, upon the plate 77 by means of a pair of guide-screws 79 passing through movement-limiting slots 80 in the slide 49, and screwed into the fixed plate 77. The stop-carrying slide 49 is further guided at its forward end by means of a guide-stud 81 projecting from the forward end of the stationary plate 77 into a guide-slot 82 provided in the forward end of the stop-carrying slide 49.

When the shift-key 67 is released, the platen 6 will be restored by gravity, assisted by the platen-restoring spring 57, from the upper case-shift position of the platen, shown in Figure 9, for printing by means of the upper-case or capital-letter types 4 of the second or outer set of types, to its second or upper normal position, shown in Figure 8, for again bringing into use the lower-case or small-letter types 3 of the second or outer set of types. The downward movement of the platen at this point is arrested by the upper platen-frame stop-shoulder 74 coming into engagement with the upper movable stop 75 carried by the stop-carrying-slide 49, as shown in Figure 8. In this return movement of the platen to its second normal position, after being case-shifted upwardly, the shift-rail frame together with the operating lever 50 and the rockable plates 55 and 63 are all rocked together as a unit about the axis of the shift-rail-frame rock-shaft 40, and the shift-key lever 68 will be raised to restore the shift-key 67 from the depressed position thereof, shown in full lines in Figure 9, to the normal position thereof, shown in broken lines in Figure 9.

Attention is directed to the fact that, in the machine of the present invention, there are provided two fixed stops 35 and 76, and two movable stops 48 and 75, with which cooperate two stop shoulders 47 and 74 on the platen frame 25. In the first or lower normal position of the platen, shown in Figure 1, for typing by means of the small-letter or lower-case type 2 of the first or inner set of types, the lower stop-shoulder 47 on the platen-frame abuts against the lower side of the lower movable stop 48, and, when the platen 6 is case-shifted downwardly, to type by means of the upper-case or capital-letter types 1 of the first or inner set of types, the upper stop-shoulder 74 on the platen-frame is brought down upon and abuts against the upper side of the fixed stop 35, formed by the carriage-end. In the converted condition of the machine, in which the platen 6 is at its second or upper normal position, for typing by means of the lower-case or small-letter types 3 of the second or outer set of types, as shown in Figure 8, the upper stop-shoulder 74 on the platen-frame abuts against or rests upon the upper movable stop 75, the two movable stops 48 and 75 both being carried by, to move as a unit with, the stop-carrying slide 49, and, when the platen 6 is case-shifted upwardly, for typing by means of the upper-case or capital-letter types 4 of the second or outer set of types, as shown in Figure 9, the lower stop-shoulder 47 of the platen-frame is raised and abuts against the lower side of the second fixed stop 76.

The hereinbefore-mentioned [illegible] mechanism will now be described. A forwardly and backwardly movable platen-shift lever or finger-piece 83 is fixed upon the outer projecting end of a short rock-shaft 84 journaled in a bracket 85 secured to the machine-frame 12, as is most clearly shown in Figures 4 and 7. In the embodiment of the invention shown in the drawings, a plurality of cams carried by the inner end of the rock-shaft 84 is provided for rocking the spring-positioning plate 55 and the platen-shifting shift-key-connected plate 63, for setting the platen from either one to the other of its two hereinbefore-described normal positions, and for shifting or setting the stop-carrying slide 49; and these cams together with the rock-shaft 84 and finger-piece 83, for convenience of description, may be called an actuating device, by reason of the fact that said cams are effective to actuate a plurality of operating devices or connections, to be hereinafter described, for moving or setting the above-noted parts, in order to set the machine so as selectively to bring into use either set of types, as hereinbefore described.

In the converter mechanism shown in the drawings, a pair of spaced cam-plates or cam-disks 86 and 87 have hubs pinned upon the inner end of the short rock-shaft 84, and are further rigidly connected together adjacent their outer edges by means of a pin 88. The cam-plate 86, adjacent the outer end of the rock-shaft 84, has therein an irregular closed cam-slot 89 for positioning or

setting the platen-restoring spring 57, while the other cam-plate 87 has therein an outer irregular closed cam-slot 90 operative to set the platen from either one to the other of the above-described normal positions, and also has an inner irregular closed cam-slot 91 for setting the stop-carrying slide 49. While the converter device, as shown in the drawings, comprising two cam-plates, one of which is provided with a single cam-slot and the other of which is provided with two cam-slots, has been adopted to carry out the invention, it is to be understood that the number of cam-plates and the disposition of the cam-slots may be varied. For example, all of the cam-slots could be provided in a single cam-plate, or a separate cam-plate could be provided for each of the cam-slots.

A rearwardly and slightly downwardly extending operating bar or link 92 is bifurcated at its forward end to form prongs 93 by which the link 92 is guided upon the hub of the cam-plate 86, and at its forward end the link 92 is pivotally connected at 94 to the lower corner of the triangular spring-positioning plate 55. The link 92 has a cam-stud 95 projecting into the cam-slot 89 of the cam-plate 86, whereby the link 92 will be operated in a manner hereinafter to be described for rocking the spring-positioning plate 55 together with the interconnected shift-lever-connected platen-shifting plate 63.

A substantially rearwardly-extending operating bar or link 96 at its rear end is pivotally connected at 97 to the adjacent shift-rail-frame side-plate 41 below the shift-rail-frame rock-shaft 40, and at its forward end is bifurcated to form prongs 98 by which it is guided upon the hub of the cam-plate 87 at the outer side thereof. The link 96 carries a cam-stud 99 which projects into the outer cam-slot 90 of the cam-plate 87, whereby the link 96 will be made effective to rock the shift-rail frame for repositioning the platen in a manner to be hereinafter described.

An upwardly and slightly rearwardly extending operating bar or link 100 is bifurcated at its lower end to form prongs 101 by which it is guided for substantially vertical sliding movement upon the hub of the cam-plate 86 adjacent to the cam-plate 87, the upper end of the link 100 being pivotally connected at 102 to the forward end of a forwardly and slightly downwardly extending arm 103 fixed upon a transverse rock-shaft 104 journaled at its ends in posts 105 on the main framework 12 of the machine. Substantially midway between its ends the rock-shaft 104 carries an upwardly and rearwardly extending operating arm 106 having at its free end a hook 107 forming therewith an open slot 108, which receives or engages a transversely-extending horizontal bar or bail rod 109, which at its ends is carried by small bail arms forming rocking plates 110 journaled at 111 upon the forward ends of the plates 77 on the respective carriage ends 35, the rod 109 sliding longitudinally in the slot 108 in the traveling movement of the carriage 30. An open slot 112, provided in the upper edge of each of the rocking plates or bail arms 110, engages a stud 113 projecting inwardly from the forward end of the adjacent stop-carrying slide 49 for imparting stop-setting sliding movement to the latter by means of a cam-stud 114 projecting from the link 100 into the inner cam-slot 91 of the cam-plate 87, whereby the stop-carrying slide 49 will be moved or shifted to set the movable stops 48 and 75 in a manner hereinafter to be described.

Although the platen-shift lever or finger-piece 83 may have a continuous forward movement in transforming the machine from the condition shown in Figure 1 to the condition shown in Figure 8, and also may have a continuous reverse or backward movement in transforming the machine from the condition shown in Figure 8 to that shown in Figure 1, it is believed that the construction and operation will be best understood by referring to the successive intermediate stages of operation which are consecutively illustrated in Figures 10 to 13, inclusive, and which occur in transforming the machine from the condition thereof shown in Figure 1 to the condition thereof shown in Figure 8, for typing with a single case-shift by means of the outer or upper set of types 3 and 4. It is to be first noted, referring more particularly to Figures 1 and 5, that the cam-slot 89 in the cam-plate 86 and the outer cam-slot 90 in the cam-plate 87 each has, at what may be termed its initial or forward end, a short out-turned radial portion 115 and 116, respectively, to provide for a slight forward movement of the respective cam-studs 95 and 99, carried by the respective links 92 and 96, when the platen is case-shifted downwardly, as shown in Figure 5. Also, the radial slot portions 115 and 116 will lock the cam-plates 86 and 87, to prevent setting movement of the converter mechanism in the case-shifted position of the platen shown in Figure 5.

In the phase of operation shown in Figure 10, the finger-piece 83 has been moved forward sufficiently to cause an outwardly-inclined portion 117 of the irregular cam-slot 89 in the cam-plate 86 to push the cam-stud 95 radially forward, whereby the operating link 92 rocks the spring-setting or spring-positioning plate 55 in a counterclockwise direction upon its fulcrum pivot 56 to a sufficient extent to bring the pivotal connecting point 60 of the platen-restoring spring 57 almost in a line with the axis of the shift-rail-frame rock-shaft 40 and the fixed point of connection 58 of the platen-restoring

spring 57, whereby the lifting effect of the platen-restoring spring 57 upon the platen is substantially neutralized or modified, in order to provide for the easy withdrawal of the movable stops 48, as shown in Figure 11. Also, as shown in Figure 10, the counterclockwise rocking of the spring-positioning plate 55 has brought the line of pull of the spring 57 from the rear to the front side of its pivot point 56, so that the spring 57 now has a tendency to impart further counterclockwise rotation to the plate 55. The counterclockwise rocking of the plate 55, through the engagement of its pin 61 in the inclined slot 62 in the shift-lever-connected platen-shifting plate 63, has rocked the latter in a clockwise direction throughout the greater extent of its movement, for changing the case-shift connection of the link 71, which is here shown as incomplete, but will be referred to further on.

During the rocking of the spring-positioning plate 55 from the position shown in Figure 1 to that shown in Figure 10, as above described, the entire shift-rail frame, together with the bifurcated plate-carrying operating lever 50, is held stationary against rocking movement as a unit by reason of the cam-stud 99 of the shift-rail-frame-connected link 96 being engaged in and held against movement by a circumferential or concentric portion 118 of the outer cam-slot 90 in the cam-plate 87, thereby preventing the platen frame 25 from dropping down. Likewise, the stop-carrying slide 49 has been held stationary at the position shown in Figure 1 by reason of a circumferential portion 119 of the inner cam-slot 91 of the cam-plate 87 engaging the cam-stud 114 of the stop-setting link 100.

In Figure 11, showing the next illustrated phase of operation, as the finger-piece 83 is moved forward the shift-rail frame and its operating arm 50 are still held stationary by the continued engagement of the cam-stud 99 in the circumferential portion of the cam-slot 90, while an upwardly-inclined portion 120 of the inner cam-slot 91 in the cam-plate 87 has lifted the cam-stud 114 to shift the stop-carrying slide 49 forwardly to an intermediate position, thereby withdrawing the lower movable stop 48 from its engagement with the stop-shoulder 47 on the platen-frame 25. During the withdrawal of the movable stop 48, the spring-positioning plate 55 and also the shift-key-controlling plate 63 have been held against rocking movement on their respective fulcrum pivots 56 and 64 in the positions shown in both Figures 10 and 11, by reason of the engagement of a circumferential or concentric portion 121 of the cam-slot 89 in the cam-plate 86 with the cam-stud 95 of the link 92, and also by reason of the continued engagement of the cam-stud 99 of the link 96 in the concentric slot portion 118 of the outer cam-slot 90 in the cam-plate 87.

In the next illustrated phase of operation, shown in Figure 12, the stop-carrying slide 49 is held stationary at its intermediate position by reason of a short circumferential or concentric portion 122 of the inner cam-slot 91 in the cam-plate 87 engaging the cam-stud 114 of the stop-setting link 100. Also, at this phase of the operation, while the plate-setting link 92 is held against movement by the continued engagement of the cam-stud 95 in the circumferential or concentric portion 121 of the cam-slot 89 in the cam-plate 86, the shift-rail frame, together with its operating arm 50, has been rocked as a unit in a clockwise direction by reason of the engagement of the cam-stud 99 on the platen-positioning link 96 with a short inwardly-inclined portion 123 of the outer cam-slot 90 in the cam-plate 87. The rocking of the shift-rail frame has raised the shift-rail 42 and has lifted the platen 6 to a position somewhat higher than its second normal position, the platen-frame 25 having been raised to a position in which the upper platen-frame stop-shoulder 74 is above, although not yet in a line with, the upper movable stop 75 on the stop-carrying slide 49. Also, as shown in Figure 12, the clockwise rocking of the operating lever 50 has moved forwardly the pivot-points 56 and 64 of the rocking plates 55 and 63, the rear pivot-point 94 of the link 92 on the plate 55 at the same time being held substantially stationary, whereby the resetting rocking movement of the shift-key-controlling plate 63 upon its fulcrum-pivot 64 is completed, relatively to the shift-rail frame, the continued travel of the pin 61 along the slot 62 having brought the forward end of the arcuate slot 66 into engagement with the stop-pin 65 on the operating arm 50 to prevent further clockwise rocking of the plate 63. Also, the pivotal connecting point 60 of the platen-restoring spring 57 has been moved forwardly to a point slightly forward of a straight line joining the axis of the shift-rail-frame rock-shaft 40 and the connecting point 58 of the platen-restoring spring 57 on the main frame 12, but without completing the counterclockwise rocking movement of the plate 55, so that the spring 57 is still substantially neutral in its effect upon the shift-rail frame, more particularly by reason of the continued engagement of the cam-stud 95 of the link 92 in the concentric portion 121 of the cam-slot 89 in the cam-plate 86, which holds the link 92, and consequently its pivotal connection 94 to the plate 55, against movement. It is to be noted that the outer end portion of the curved slot 62 in the shift-key-controlling plate 63 is now substantially concentric with the fulcrum-pivot 56 of the spring-setting plate 55, to

provide for the further movement of the pin 62 of the plate 55 to its final position shown in Figure 8.

In the next illustrated stage of operation of the converter mechanism, shown in Figure 13, the shift-rail frame and the rockable plates 55 and 63 are all held at the same position shown in Figure 12, by reason of the continued engagement of the cam-stud 95 in the concentric portion 121 of the cam-slot 89 in the cam-plate 86, and by reason of the engagement of the cam-stud 99 of the shift-rail-frame-setting link 96 in another concentric portion 124 of the outer cam-slot 90 in the cam-plate 87. However, as shown in Figure 13, the cam-stud 114 of the stop-setting link 100 has been raised by a second raised or outwardly-inclined portion 125 of the inner cam-slot 91 in the cam-plate 87, to lift the link 100 and shift the stop-carrying slide 49 from its intermediate position, shown in Figures 11 and 12, to its final forward position, thereby to move forward and set the upper movable stop 75 directly beneath or in alignment with the upper stop-shoulder 74 on the platen-frame 25.

The final or completed stage of operation of the converter device, following that shown in Figure 13, is shown in Figure 8. As the forward movement of the finger-piece 83 is continued, for continuing the counterclockwise rotative movement of the cam-plates 86 and 87, the cam-stud 95 of the link 92 rides outwardly in a second or final outwardly-inclined portion 126 of the cam-slot 89 in the cam-plate 86 to push forward the link 92, to impart a final counterclockwise rocking movement to the spring-setting plate 55, until such movement is stopped by the engagement of the pin 61 against the outer end of the curved slot 62 in the shift-lever-connected plate 63, whereupon, by reason of the locked condition of the plates 55 and 63, as hereinbefore described, the shift-rail frame is rocked to bring the platen-frame 25 down until its upper stop-shoulder 74 rests upon the upper movable stop 75, as shown in Figure 8, the downward movement of the platen-frame being assisted by gravity and by the platen restoring spring 57, the connecting point 60 of which has been brought farther forward. The end or terminus of the final outwardly-inclined slot portion 126 extends outward to a sufficient extent to permit the platen-frame stop-shoulder 74 to rest freely upon the upper movable stop 75 without being hampered by the cam-stud 95, this final outwardly-inclined portion 126 of the cam-slot providing a slight clearance at the front of the cam-stud 95, as shown in Figure 8. In view of the fact that the substantially horizontal operating link 96 will, in its final stage of operation, have a slightly rearward movement imparted thereto, by reason of its connection at 97 to the shift-rail frame, the outer cam-slot 90 in the cam-plate 87, at the end of its second or inner circumferential portion 124, has a slight outwardly-extending portion 127 in order to provide clearance at the front of the cam-stud 99 of the link 96, as appears most clearly in Figure 8, whereby the link 96 will permit the platen-frame stop-shoulder 74 to rest freely upon the movable stop 75. In this final phase of operation of the converter device, from the condition shown in Figure 13 to the final condition thereof shown in Figure 8, the cam-stud 114 of the stop-setting link 100 will engage in a final outer concentric portion 128 of the inner cam-slot 91 in the cam-plate 87, to hold the stop-carrying slide 49 at its forwardly-set position.

When the platen 6 is case-shifted upwardly to the position shown in Figure 9, as hereinbefore described, the operating links 92 and 96 will have a forward movement imparted thereto, and, in order to accommodate this movement, the cam-slot 89 in the cam-plate 86 has a final inturned radial portion 129, and the outer cam-slot 90 of the cam-plate 87 has a similar inturned radial portion 130 to permit the free rearward movement of the cam-studs 95 and 99, respectively, when the platen is case-shifted upwardly from its second normal position, as shown in Figure 8, to its upper case-shift position, as shown in Figure 9. Also, it is to be noted that the inturned radial slot portions 129 and 130 lock the rockable cam-plates 86 and 87, so as to prevent the resetting of the converter mechanism in the case-shift position of the platen shown in Figure 9.

It will now be clear as to how the converter mechanism through the forward movement of the finger-piece 83, has converted the machine from the condition shown in Figures 1 and 5 for typing with a single case-shift by means of the lower or inner set of types 2 and 1, to the condition shown in Figures 8 and 9 for typing with a single case-shift by means of the types 3 and 4 of the outer set of types. Since the three cam-slots 89, 90 and 91 form double-faced cams, it is evident that the machine may be reconverted from the condition shown in Figure 8 to the condition shown in Figure 1 merely by moving rearwardly the finger-piece 83, thereby to cause the converter mechanism to pass reversely through the successive stages illustrated consecutively in reverse order in Figures 13, 12, 11, 10 and 1.

In carrying out the present invention, a usual universal bar 131, guided by the type-bar segment 10, is struck and moved rearwardly by usual shoulders 132, formed on the type-bars 7, to move rearwardly a substantially usual universal-bar frame 133,

carried at its forward end by the universal bar 131, and at its rear end having usual rearwardly-projecting side arms 134, by which it is pivotally supported at 135 on the upper ends of rocking arms 136, forming parts of a usual rocking frame, all of which is not shown in the drawings, but which is journaled at 137 upon an upstanding bracket 138, forming part of the general framework 12, as shown in Figure 2. The universal bar 131 and universal-bar frame 133 are returned to their normal forward positions by means of a usual spring 139 (Figure 2). The universal-bar frame 133 has a usual tappet-forming rear transverse bar 140, to engage and push rearwardly and adjusting screw 141, carried by the upper end of a usual dog-rocker 142, journaled at 143 on the bracket 138, and forming part of a usual escapement mechanism. The dog-rocker 142 carries fixed and loose dogs 144 and 145, returnable to their normal positions by a usual spring 146 (Figure 2). The dogs 144 and 145 are engageable with an escapement-wheel 147, which may have a usual spring-pressed ratchet-connection 148 with a pinion 149, engageable with the usual rack (not shown), carried by the platen-frame 25.

The ribbon-vibrating mechanism, forming a feature of the present invention, will now be described. A substantially usual ribbon-guide 150, at the front of the platen, guides and vibrates a usual ribbon 151. The ribbon-guide 150 has a downwardly-extending stem-part 152 provided with small forwardly-projecting guide-lugs 153, by which the ribbon-guide is guided for up-and-down ribbon-vibrating movement upon a usual type-guide 154 mounted upon the type-bar segment 10. Below the guide-lugs 153, the stem 152 of the ribbon-guide extends downward in a space provided at the rear of the type-bar segment 10 between the type-bar segment and its supporting bar 11. At its lower end the stem 152 carries a small pivot-pin 155, which engages in a substantially horizontal slot 156 provided in the forward end of a substantially usual bent ribbon-vibrating lever 157, which is pivoted at 158 upon a small bracket 159, which is fixed upon and extends downwardly and rearwardly from the shift-rail 42. The ribbon-vibrating lever 157 is provided with a short upstanding arm 160 forming a bell-crank therewith, and the upper end of the arm 160 carries a pin 161 to engage in a downwardly-opening vertical slot 162 provided in a ribbon-vibrating bracket 163, which is firmly but adjustably secured to the rear of tappet-forming bar 140 of the universal-bar frame 133 by means of a pair of screws 164 passing through slots 165 in the downwardly and rearwardly turned end of the bracket 163.

When the platen 6 is moved upwardly by the shift-rail 42, the fulcrum-pivot 158 of the ribbon-vibrating lever 157 will be moved upwardly substantially to the same extent as the platen, and the pin 161 on the upper end of the short upstanding arm 160 of the ribbon-vibrating lever will travel upwardly in the vertical slot 162 in the ribbon-vibrating bracket 163, so that thereby the ribbon-guide 150 will move upwardly with the platen with the ribbon 151 below the printing point on the platen. When a type-key 13 is depressed, the slotted bracket 163 will be moved rearwardly by the universal-bar frame 133 to vibrate the ribbon 151 upwardly to cover the printing point on the platen in substantially the same manner as in the standard Underwood typewriting machine. The above-noted operation will take place in the condition of the machine shown in Figure 1, in which the platen is at its first normal position, and in which the pin 161 of the ribbon-vibrating lever is engaged in the lower end of the downwardly-opening vertical slot 162 in the operating bracket 163. Also, the same operation will take place in the converted condition of the machine shown in Figure 8, in which the platen has been moved upwardly to its second normal position, and in which the pin 161 has correspondingly been moved upwardly in the slot 162 to a substantially middle position therein. Also, the same operation of raising and vibrating the ribbon-guide 150 will take place when the platen has been case-shifted to its uppermost position, shown in Figure 9, in which the pin 161 has traveled to the top of the vertical slot 162 in the ribbon-vibrating bracket 163. However, when the platen is case-shifted downwardly, as shown in Figure 5 and as hereinbefore described, the pin 161 is permitted to escape from the lower end of the slot 162, so that the ribbon-guide 150 and consequently the ribbon 151 are not moved downwardly with the platen but are held at the same position, shown in Figure 1, by means of a sufficiently stiff stationary arm 166 rigidly secured to the frame-bracket 138 and projecting forwardly beneath the ribbon-vibrating lever 157 to form a support or rest therefor.

The ribbon-vibrating bracket 163 is cut away at 167 below and to the rear of the slot 162 to permit the pin 161 upon the short upstanding arm 160 of the ribbon-vibrating lever to move freely rearwardly when the fulcrum-pivot 158 of the ribbon-vibrating lever is lowered by the lowering of the shift-rail 42 when the platen is case-shifted downwardly from the first normal position thereof, shown in Figure 1, to its lower case-shift position hereinbefore described and shown in Figure 5. When a type-key 13 is depressed, the bracket 163 will be moved rearwardly without vibrating the ribbon, the cut-away bracket-part 167 being then retracted rearwardly away from the pin 161, as will be

clear from an inspection of Figure 5. It will now be understood that, when the platen is case-shifted downwardly, the ribbon 151 is not vibrated but is held stationary to cover the printing point on the platen, both in the normal and depressed positions of the type-keys 13, so that the printing point on the platen is at all times covered by the ribbon 151 when typing with the upper-case types 1 of the lower or inner set of types, the construction and operation being thereby simplified, as in the present invention it is not desired nor considered necessary to uncover the printing point while typing with the upper-case or capital-letter types 1 of the lower or inner set of types, inasmuch as capital letters or other upper-case characters are used comparatively infrequently.

The ribbon 151 is alternately wound upon and fed from a pair of usual ribbon-spools 168 carried upon the upper ends of shafts 169, journaled in brackets 170 forming part of the main machine frame 12 at the sides and front thereof. The ribbon-winding mechanism is not shown, but it may be of the usual Underwood or of any suitable construction.

In carrying out the present invention, the substantially usual front rail 39, scale-carrying frame-bar 171 and margin-gage rod 172, together with their adjuncts, are all raised and brought forward as a unit, in order to clear the extended four-type type-bars 7. Also, the rock-shaft 104, forming a part of the stop-setting means, as hereinbefore described, is located sufficiently forw rd and at a height to give clearance to the outer ends of the extended type-bars 7. By a-son of the raising and bringing forward of the front rail 39 and associated parts, the front carriage-bar 36 is correspondingly raised and brought forward, the carriage ends 35 being correspondingly raised and lengthened at their forward ends, as is clearly shown in Figure 1. The front rail 39, the front frame-bar 171 and margin-gage rod 172 are secured at their ends to a pair of bracket-members 173 mounted upon and extending forwardly and upwardly from the upper ends of the frame-posts 105, thereby providing for the raising and moving forward of the front rail 39 and its associated parts, merely by attaching the bracket-members 173 to the usual Underwood front frame-posts 105, without the necessity of lengthening these posts, whereby the usual Underwood frame-posts 105 may be utilized in the present invention. Each bracket-member 173 is secured to the outer side of the adjacent frame-post 105 by means of a rear screw 174 and a forward screw 175, which is shown as coincident with and which may form a journal for the rock-shaft 104. It may be noted in this connection that the screws 174 and 175 occupy substantially the same locations that in the standard Underwood machine would be occupied by the ends of the front rail 39 and margin-gage rod 172, respectively.

The margin-gage or margin-stop devices carried by the margin-gage rod 172 may be, and as shown are, substantially the same as are found in the standard Underwood typewriting machine. A right-hand margin-stop 176, Figures 1 and 4, has a spring-pressed pawl-member 177 engageable with left-wardly-inclined rack-teeth 178 upon the front face of the front rail 39, and disengageable therefrom by squeezing together a pair of forwardly-projecting finger-pieces 179 and 180, in order to set the margin-stop 176 towards the right, it being freely slidable towards the left by reason of the inclined rack-forming teeth 178. The margin-stop 176 extends below and rearwardly beyond the front rail 39 to provide a carriage-stop 181, which is engageable by a small lug or shoulder 182 carried by the inner end of a release-lever 183, pivoted at 184 on the front bar 36 of the carriage, and provided at its outer end with an upstanding finger-piece 185, which, when depressed, will disengage the stop-lug 182 from the stop 181, to provide for moving the carriage farther towards the right when desired, as is usual in the standard Underwood machine. The margin-stop 176 is provided with a usual index or pointer 186 to overlie the lower margin of a usual scale-plate 187 mounted upon the transverse frame-bar 171.

A left hand margin-stop 188 carries a pointer 189 to co-operate with the scale-plate 187, and has forwardly-projecting finger-pieces 190 and 191, which, when pressed together, will release the margin-stop from a rack-bar 192, having rack-teeth 193 inclined oppositely to the rack-teeth 178 on the front rail 39. The rack-bar 192 is mounted at its ends to swing upon the margin-gage rod 172 by means of arms 194 on the ends of the rack-bar 192, so as to be operated in the usual manner by a bell-ringing and line-locking device, not shown, but which may be substantially the same as in the standard Underwood typewriting machine. The housing 37, on the front carriage-bar 36, carries a usual pointer 195 to co-operate with the scale-plate 187.

It will be understood that many features of the invention are also useful where only a single alphabet or gamut of types is employed, in cases where it is desired to employ a large number of special types or characters in connection with such single alphabet or set, whether or not such single set includes both upper and lower case letters or upper-case letters only; it being apparent that the invention can be used for placing an enormous number of special characters at the disposal of the operator, if desired. It is not essential in all ways of carrying out certain features of the invention,

that more than three types be placed on each bar. Certain features, as, for example, the type-action, are useful where each type-bar carries only two types, or even one.

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 front-strike type-bar double typewriting machine, the combination with a platen, of two sets of related types, lever-actuated mechanism including relatively movable, connected, rocking elements operable to change and maintain a set relation between said platen and the two sets of types to bring into active use either set, a lever, means connecting said lever to said rocking elements, means to support said platen, and key-actuated means connected to said platen-support and operable subsequent to the setting of the rocking elements to case-shift the platen for the active set of types to promote typing in upper-case characters.

2. In a front-strike type-bar double typewriting machine, in combination, a platen, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, the platen being settable for bringing into use either set of types to the exclusion of the other set, shiftable to bring into use the upper-case types of whichever set of types may be in use, a converter-mechanism for setting the platen from either one of two normal positions, to bring into use either set of types to the exclusion of the other set, and case-shifting means controlled by said converter-mechanism to be made effective thereby for case-shifting the platen from either normal position to case-shift positions, for bringing into use the upper-case types of whichever set of types may be in use.

3. In a front-strike type-bar double typewriting machine, in combination, a platen, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, the platen and the set of type-bars being relatively settable for bringing into use either set of types to the exclusion of the other set, the platen being mounted for case-shift movement to bring into use the upper-case types of whichever set of types may be in use, a converter-mechanism for relatively setting the platen and the set of type-bars, from either one to the other of two different normal relative positions, to bring into use either set of types to the exclusion of the other set, and case-shifting means controlled by said converter-mechanism to be made effective thereby for case-shifting the platen from either of its normal positions to a case-shift position for bringing into use the upper-case types of whichever set of types may be in use.

4. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, a platen settable for bringing into use either set of types to the exclusion of the other set, the platen and the set of type-bars being relatively shiftable to bring into use the upper-case types of whichever set of types may be in use, a converter-mechanism for setting the platen, from either one to the other of two normal positions, for bringing into use either set of types to the exclusion of the other set, and case-shifting means controlled by said converter-mechanism to be made effective thereby for relatively case-shifting the platen and the set of type-bars from either of their relative normal positions to relative case-shift positions for bringing into use the upper-case types of whichever set of types may be in use.

5. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, a platen mounted to be settable for bringing into use either set of types to the exclusion of the other set, and mounted for case-shift movement for bringing into use the upper-case types of whichever set of types may be in use, a converter-mechanism for setting the platen, from either one to the other of two normal positions, for bringing into use either set of types to the exclusion of the other set, and case-shifting means controlled by said converter-mechanism to be made effective thereby for case-shifting the platen, from either of its normal positions to a case-shift position, for bringing into use the upper-case types of whichever set of types may be in use.

6. In a front-strike type-bar double typewriting machine, in combination, a platen, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, the platen being settable for bringing into use either set of types to the exclusion of the other set and also shiftable to bring into use the upper-case types of whichever set of types may be in use, a converter-mechanism for setting the platen from either one of two normal positions to bring into use either set of types to the exclusion of the other set, a single shift-key, and a shift-key-operated connection settable by means of said converter-mechanism to enable the shift-key to be effective for case-shifting the platen from either normal position for bringing

into use the upper case types of whichever set of types may be in use.

7. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having two sets of types thereon arranged longitudinally thereof, and each set of types comprising upper-case and lower-case types, a platen mounted to be settable for bringing into use either set of types to the exclusion of the other set, and mounted for case-shift movement for bringing into use the upper-case types of whichever set of types may be in use, a converter-mechanism for setting the platen, from either one to the other of two different normal positions, for bringing into use either set of types to the exclusion of the other set, means for maintaining the platen at whichever of its normal positions it may be set by said converter-mechanism, a single shift-key, and a shift-key-operated connection settable by means of said converter-mechanism correspondingly to the setting of the platen to enable the shift-key to be effective for case-shifting the platen from either one or the other of its normal positions to a case-shift position for bringing into use the upper-case types of whichever set of types may be in use.

8. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, the two intermediate types being lower-case types of the respective sets of types, and the two end types in the series being upper-case types of the respective sets of types, a platen mounted to be substantially vertically settable from one to the other of a lower and an upper normal position, for typing by means of the lower-case types of one set of types, or for typing by means of the lower-case types of the other set of types, the platen being case-shiftable downwardly from its lower normal position to a case-shift position for typing by means of the lowermost or upper-case types of the lower set of types, and being case-shiftable upwardly from its upper normal position to a case-shift position for typing by means of the uppermost or upper-case types of the upper set of types, a converter-mechanism including cam-actuated means for setting and locking the platen to either one or the other of its two normal positions, and means for case-shifting the platen downwardly from its lower normal position, and upwardly from its upper normal position, to one or the other of two final case-shift positions, for typing by means of the upper-case types of the respective sets of types.

9. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, the two intermediate types being lower-case types of the respective sets of types, and the two end types in the series being upper-case types of the respective sets of types, a platen mounted to be substantially vertically settable from one to the other of a lower and an upper normal position, for typing by means of the lower-case types of one set of types, or for typing by means of the lower-case types of the other set of types, the platen being case-shiftable downwardly from its lower normal position to a case-shift position for typing by means of the lowermost or upper-case types of the lower set of types, and being case-shiftable upwardly from its upper normal position to a case-shift position for typing by means of the uppermost or upper-case types of the upper set of types, a converter-mechanism for setting the platen to either one or the other of its two normal positions, a single shift-key, and a connection for the shift-key settable by means of said converter-mechanism to render the shift-key effective to shift the platen downwardly from its lower normal position for typing by means of the upper-case types of the lower set of types, or to shift the platen upwardly from its upper normal position for typing by means of the upper-case types of the upper set of types, the platen being automatically returnable from either of its said case-shift positions to the corresponding normal position.

10. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, the two intermediate types being lower-case types of the respective sets of types, and the two end types in the series being upper-case types of the respective sets of types, a platen mounted to be substantially vertically settable from one to the other of a lower and an upper normal position, for typing by means of the lower-case types of one set of types, or for typing by means of the lower-case types of the other set of types, the platen being case-shiftable downwardly from its lower normal position to a case-shift position for typing by means of the lowermost or upper-case types of the lower set of types, and being case-shiftable upwardly from its upper normal position to a case-shift position for typing by means of the uppermost or upper-case types of the upper set of types, a converter-mechanism for setting the platen to either one or the other of its two normal positions, a single shift-key, a connection for the shift-key set-

table by means of said converter-mechanism to render the shift-key effective to shift the platen downwardly from its lower normal position, for typing by means of the upper-case types of the lower set of types, or to shift the platen upwardly from its upper normal position for typing by means of the upper-case types of the upper set of types, the platen being automatically returnable from its uppermost case-shift position to its upper normal position, and a platen-restoring spring controlled by said converter-mechanism, for lifting the platen from its lowermost case-shift position to its lower normal position.

11. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, the two intermediate types being lower-case types of the respective sets of types, and the two end types in the series being upper-case types of the respective sets of types, a platen mounted to be substantially vertically settable from one to the other of a lower and an upper normal position, for typing by means of the lower-case types of one set of types, or for typing by means of the lower-case types of the other set of types, the platen being case-shiftable downwardly from its lower normal position to a case-shift position for typing by means of the lowermost or upper-case types of the lower set of types, and being case-shiftable upwardly from its upper normal position to a case-shift position for typing by means of the uppermost or upper-case types of the upper set of types, a converter-mechanism for setting the platen to either one or the other of its two normal positions, a single shift-key, a connection for the shift-key settable by means of said converter-mechanism to render the shift-key effective to shift the platen downwardly from its lower normal position for typing by means of the upper-case types of the lower set of types, or to shift the platen upwardly from its upper normal position for typing by means of the upper-case types of the upper set of types, the platen being automatically returnable from its uppermost case-shaft position to its upper normal position, a platen-restoring spring controlled by said converted-mechanism for lifting the platen from its lowermost case-shift position to its lower normal position, a platen-frame, stationary stops to limit the case-shift movements of the platen-frame, and movable stops settable by means of said converter-mechanism to limit the return movements of the platen-frame.

12. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, the two intermediate types being lower-case types of the respective sets of types, and the two end types in the series being upper-case types of the respective sets of types, a platen mounted to be substantially vertically settable from one to the other of a lower and an upper normal position, for typing by means of the lower-case types of one set of types, or for typing by means of the lower-case types of the other set of types, the platen being case-shiftable downwardly from its lower normal position to a case-shift position, for typing by means of the lowermost or upper-case types of the lower set of types, and being case-shiftable upwardly from its upper normal position to a case-shift position for typing by means of the uppermost or upper-case types of the upper set of types, a converter-mechanism for setting the platen to either one or the other of its two normal positions, a single shift-key, a connection for the shift-key settable by means of said converter-mechanism to render the shift-key effective to shift the platen downwardly from its lower normal position, for typing by means of the upper-case types of the lower set of types, or to shift the platen upwardly from its upper normal position, for typing by means of the upper-case types of the upper set of types, a platen-restoring spring settable by means of said converter-mechanism so as to be made effective either to lift the platen from its lowermost case-shift position to its lower normal position, or to assist gravity in returning the platen downwardly from its uppermost case-shift position to its upper normal position, a platen-frame, stationary stops to limit the case-shift movements of the platen-frame, and movable stops settable by means of said converter-mechanism to limit the return movements of the platen-frame.

13. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper case-shift positions thereof, a rockable shift-rail frame to move the platen frame for positioning the platen, a single shift-rail-frame-connected shift-key, a shift-rail-frame-connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift

positions of the platen, and a converter-mechanism comprising means for rocking the shift-rail frame to bring into use either of the said sets of types to the exclusion of the other set, said converter-mechanism further comprising means for changing or shifting the connection of the shift-key to the shift-rail frame so as to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, means for changing or shifting the connection of the platen-restoring spring to the shift-rail frame to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set of types is in use, and so as to discontinue its lifting effect upon the platen when the upper set of types is brought into use, movable stops for the platen-frame, and means for setting said movable stops to limit the return movements of the platen at each of its normal positions, as determined by the set of types that may be in use.

14. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper-case-shift positions thereof, a rockable shift-rail frame to move the platen-frame for positioning the platen, a single shift-rail-frame-connected shift-key, a shift-rail-frame-connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift positions of the platen, and a converter-mechanism for bringing into use either of said sets of types to the exclusion of the other set, said converter-mechanism comprising a shift-key connected member shiftably or settably mounted on the shift-rail frame for changing or shifting the connection thereto of the shift-key to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, a spring-connected member shiftably or settably mounted on the shift-rail frame for changing or shifting the connection of the platen-restoring spring to the shift-rail frame to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set of types is in use, and so as to discontinue the lifting effect of said spring upon the platen when the upper set of types is brought into use, movable stops for the platen-frame, a shiftable or settable member carrying said movable stops for setting said movable stops to limit the return movements of the platen at each of its normal positions as determined by the set of types that may be in use, and a single manually-operable actuating device movable between two limiting positions for setting all three of said settable members, and also for rocking the shift-rail frame to set the platen from either one to the other of its two normal positions.

15. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper case-shift positions thereof, a rockable shift-rail frame to move the platen-frame for positioning the platen, a single shift-rail-frame-connected shift-key, a shift-rail-frame-connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift positions of the platen, and a converter-mechanism for bringing into use either of the said sets of types to the exclusion of the other set, said converter-mechanism comprising a shift-key-connected rockable member fulcrumed upon the shift-rail frame and settable thereon to change or shift the connection of the shift-key to the shift-rail frame, so as to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, a rockable spring-connected member fulcrumed upon the shift-rail frame and settable to change or shift the connection of the platen-restoring spring to the shift-rail frame to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set

of types is in use, and so as to discontinue its lifting tendency upon the platen when the upper set of types is brought into use, movable stops for the platen-frame, a shiftable or settable stop-carrying member for setting said movable stops to limit the return movements of the platen to each of its normal positions as determined by the set of types in use, and a single manually-operable actuating device movable between two limiting positions for rocking said rockable members upon the shift-rail frame, for setting said stop-carrying member, and for rocking the shift-rail frame to set the platen from either one to the other of its two normal positions.

16. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper case-shift positions thereof, a rockable shift-rail frame to move the platen-frame for positioning the platen, a single shift-rail frame-connected shift-key, a shift-rail-frame-connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift positions of the platen, and means for bringing into use either of said sets of types to the exclusion of the other set, said means comprising a single manually-operable actuating device movable between two limiting positions, a rockable shift-key-connected plate fulcrumed upon the shift-rail frame and settable for changing or shifting the connection of the shift-key to the shift-rail frame, so as to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, a rockable spring-connected spring-setting plate fulcrumed upon the shift-rail frame and settable for changing or shifting the connection of the platen-restoring spring to the shift-rail frame, to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set of types is in use, or to rock the shift-rail frame in the other direction to enable said spring to assist gravity in returning the platen downwardly from its upper case-shift position to its upper normal position when the upper set of types is in use, means operable by said actuating device for setting said rockable plates, means operable by said actuating device for rocking the shift-rail frame to set the platen to either one or the other of its two normal positions, and movable stops settable by means of said actuating device to limit the return movements of the platen-frame at each of the two intermediate or normal positions of the platen.

17. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper case-shift positions thereof, a rockable shift-rail frame to move the platen-frame for positioning the platen, a single shift-rail-frame-connected shift-key, a shift-rail-frame connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift positions of the platen, and means for bringing into use either of said sets of types to the exclusion of the other set, said means comprising a single manually-operable actuating device movable between two limiting positions, a rockable shift-key-connected plate fulcrumed upon the shift-rail frame and settable for changing or shifting the connection of the shift-key to the shift-rail frame, so as to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, a rockable spring-connected spring-setting plate fulcrumed upon the shift-rail frame and settable for changing or shifting the connection of the platen-restoring spring to the shift-rail frame to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set of types is in use, or to rock the shift-rail frame in the other direction to enable said spring to assist gravity in returning the platen downwardly from its upper case-shift position to its upper normal position when the upper set of types is in use, a connection between said rockable plates to cause said spring-setting plate to impart rocking movement in an opposite direction to said shift-key-connected plate, a connection from said spring-setting

plate to said actuating device for shifting or setting said plates between limiting positions by means of said actuating device, a connection from the shift-rail frame to said actuating device for rocking the shift-rail frame to set the platen from either one to the other of its two normal positions, movable stops for the platen-frame, a shiftable or settable member carrying said movable stops and settable for setting said movable stops to limit the return movements of the platen to each of its normal positions as determined by the set of types in use, and operating connections between said stop-carrying member and said actuating device for setting the movable stops by means of said actuating device.

18. In a front-strike type-bar double typewriting machine, in combination, a set of type-bars each having four types thereon arranged in a row or series longitudinally thereof and forming a lower set of types and an upper set of types of two types each, a platen, a substantially vertically movable platen-frame for positioning the platen at any one of four positions for bringing into use the corresponding types, the two-intermediate positions of the platen being lower and upper normal positions thereof and the two extreme positions of the platen being lower and upper case-shift positions thereof, a rockable shift-rail frame to move the platen-frame for positioning the platen, a single shift-key lever, a shift-rail-frame-connected link pivoted to the shift-key lever, a shift-rail-frame-connected platen-restoring spring, fixed stops for limiting the movements of the platen-frame at the extreme or case-shift positions of the platen, and means for bringing into use either of said sets of types to the exclusion of the other set, said means comprising a single rockable manually-operable actuating device including a plurality of rockable double-acting cams, a rockable plate fulcrumed upon the shift-rail frame and pivotally connected to said link of the shift-key lever for swinging said link on the shift-key lever, so as to enable the shift-key to rock the shift-rail frame in one direction for shifting the platen downwardly when the lower set of types is in use, or to rock the shift-rail frame in the other direction to shift the platen upwardly when the upper set of types is in use, a rockable spring-connected spring-setting plate fulcrumed upon the shift-rail frame and settable for changing or shifting the connection of the platen-restoring spring to the shift-rail frame, to enable said spring to rock the shift-rail frame in a direction for lifting the platen to return the platen upwardly from its lower case-shift position to its lower normal position when the lower set of types is in use, or to rock the shift-rail frame in the other direction to enable said spring to assist gravity in returning the platen downwardly from its upper-case shift position to its upper normal position when the upper set of types is in use, a connection between said rockable plates to cause said spring-setting plate to rock said link-connected plate in an opposite direction between limiting positions and also to limit the rocking movements of said spring-setting plate, a link connected to said spring-setting plate and operable by one of said cams for shifting or setting said plates by means of said actuating device, a link connected to the shift-rail frame and operable by another of said cams for rocking the shift-rail frame to set the platen from either one to the other of its two normal positions, two pairs of movable stops settable to limit the return movements of the platen-frame at each of the two intermediate or normal positions of the platen, at each end of the platen-frame, a shiftable or settable stop-carrying member carrying a pair of said movable stops, and operating connections connected to said stop-carrying members including a link operable by another of said cams for setting the movable stops by means of said actuating device.

19. A front-strike four-type type-bar double typewriting machine having, in combination, a four-position platen, a substantially vertically movable platen-frame, a rockable shift-rail frame engaging the platen-frame for positioning the platen, the types forming two sets, the two intermediate positions of the platen being lower and upper normal positions and the two extreme positions being upper and lower case-shift positions thereof, a single shift-rail-frame-connected shift-key, a rockable shift-key-controlling plate fulcrumed on the shift-rail frame and settable for changing the connection of the shift-key to the shift-rail frame for shifting the platen downwardly from its lower normal position to its lower extreme position, or for shifting the platen upwardly from its upper normal position to its upper extreme position, a platen-restoring spring, a rockable spring-controlling plate fulcrumed on the shift-rail frame and to which said spring is connected to be set thereby to enable said spring to return the platen from its lower case-shift position, or to enable said spring to assist gravity in returning the platen from its upper case-shift position, fixed stops for the platen-frame for limiting the case-shift movements of the platen, movable stops to determine the normal positions of the platen, a settable stop-carrying member carrying said movable stops, a manually-operable cam-device movable between limiting positions and including a plurality of double-acting cams, means operable by one of said cams for setting said rockable plates, means operable by another of said cams for rocking the shift-rail frame to set the

platen from either one to the other of its two normal positions, and means operable by another of said cams for shifting the settable stop-carrying member to set the movable stops, said cams being so shaped that, when said cam-device is moved in a direction to set the machine from a condition for typing by means of the lower set of types to a condition for typing by means of the upper set of types, first, said rockable plates will be rocked to a position in which the platen-lifting tendency of said platen-restoring spring is substantially nullified or neutralized and in which the shifting of the connection of the shift-key to the shift-rail frame has only partly taken place; second, said stop-carrying member will be shifted to an intermediate position to withdraw the movable stop which limits the return movement of the platen from its lower case-shift position to its lower normal position; third, the platen will be set upwardly from its lower normal position to a position slightly above its upper normal position, and at the same time the rocking movement of said shift-key-controlling plate upon the shift-rail frame will be completed, said platen-restoring spring being further shifted but remaining substantially neutral; fourth, the movement of the stop-carrying member will be completed to set the other movable stop in a position for limiting the downward movement of the platen at its upper normal position; and fifth, or finally, the rocking movement of said spring-controlling plate will be completed until it rests upon said set movable stop, the platen-restoring spring being set to a final position in which it will assist gravity in yieldingly holding down the platen-frame, thereby setting the machine to a condition for typing by means of the upper set of types, and whereby, by moving said cam-device reversely to its other limiting position, said above-recited series of movements will be reversed for restoring the machine to a condition for typing by means of the lower set of types.

20. A front-strike four-type type-bar double typewriting machine having, in combination, a four-position platen, a substantially vertically movable platen-frame, a rockable shift-rail frame having downwardly-extending portions and having forwardly-extending portions carrying the shift-rail for moving the platen-frame to position the platen, the types forming two sets, the two intermediate positions of the platen being lower and upper normal positions and the two extreme positions being lower and upper case-shift positions thereof, a single shift-key lever having a forwardly-movable upwardly-extending arm at the front of and below the axis of the shift-rail frame, a rockable shift-key-controlling plate fulcrumed on the shift-rail frame below and forwardly of the axis thereof, a link pivoted at one end to said upstanding arm of the shift-key lever and pivoted at its other end to said rockable plate to be shifted or set thereby to a position at the front of the axis of the shift-rail frame for shifting the platen downwardly, or to a position below the axis of the shift-rail frame for shifting the platen upwardly, a platen-restoring spring, a rockable spring-controlling plate fulcrumed on the shift-rail frame below the axis thereof and to which said spring is connected to be shifted or set thereby to a position at which said spring exerts its tension along a line passing to the rear of the shift-rail-frame axis for returning the platen from its lower case-shift position, or to a position in which said spring exerts its tension along a line passing to the front of the shift-rail-frame axis, so that said spring will assist gravity in returning the platen from its upper case-shift position, a connection between said rockable plates to cause said spring-controlling plate to rock said shift-key-controlling plate in an opposite direction between limiting positions and for limiting the rocking movement of said spring-controlling plate, fixed stops for the platen-frame for limiting the case-shift movements of the platen, movable stops to determine the normal positions of the platen, a settable stop-carrying member carrying said movable stops, a manually-operable cam-device including a plurality of double-acting cams rockable upon a transverse axis at the front of the machine, a substantially longitudinally movable link connected to said spring-controlling plate and extending forwardly to said cam-device to be operated by one of said cams for setting said rockable plates, a second substantially longitudinally movable link connected to the shift-rail frame below the axis thereof and extending forwardly to said cam-device to be operated by another of said cams for setting the platen from either one to the other of its two normal positions, means for shifting the stop-carrying member including a third substantially longitudinally movable link extending downwardly to said cam-device to be operated by another of said cams for setting said movable stops, said links all converging towards the axis of said cam-device, and guiding means for said links adjacent said cam-device.

21. A front-strike four-type type-bar double typewriting machine having, in combination, a four-position platen, a substantially vertically-movable platen-frame, a rockable shift-rail frame having downwardly-extending portions and having forwardly-extending portions carrying the shift-rail for moving the platen-frame to position the platen, the types forming two sets, the two intermediate positions of the platen being lower and upper normal positions and the

two extreme positions being lower and upper case-shift positions thereof, a single shift-key-lever having a forwardly-movable upwardly-extending arm at the front of, and below the axis of, the shift-rail frame, a rockable shift-key-controlling plate fulcrumed on the shift-rail frame below and forwardly of the axis thereof, a link pivoted at one end to said upstanding arm of the shift-key lever and pivoted at its other end to said rockable plate to be shifted or set thereby to a position at the front of the axis of the shift-rail frame for shifting the platen downwardly, or to a position below the axis of the shift-rail frame for shifting the platen upwardly, a platen-restoring spring, a rockable spring-controlling plate fulcrumed on the shift-rail frame below the axis thereof and to which said spring is connected to be shifted or set thereby to a position at which said spring exerts its tension along a line passing to the rear of the shift-rail-frame axis for returning the platen from its lower case-shift position, or to a position in which said spring exerts its tension along a line passing to the front of the shift-rail-frame axis, so that said spring will assist gravity in returning the platen from its upper case-shift position, a connection between said rockable plates to cause said spring controlling plate to rock said shift-key-controlling plate in an opposite direction between limiting positions and to limit the rocking movement of said spring-controlling plate, fixed stops for the platen-frame for limiting the case-shift movements of the platen, movable stops to determine the normal positions of the platen, a settable stop-carrying member carrying said movable stops, a manually-operable cam-device including a plurality of double-acting cams rockable upon a transverse axis at the front of the machine, a substantially longitudinally-movable link connected to said spring-controlling plate and extending forwardly to said cam-device to be operated by one of said cams for setting said rockable plates, a second substantially longitudinally-movable link connected to the shift-rail frame below the axis thereof and extending forwardly to said cam-device to be operated by another of said cams for setting the platen from either one to the other of its two normal positions, means for shifting the stop-carrying member including a third substantially longitudinally-movable link extending downwardly to said cam-device to be operated by another of said cams for setting said movable stops, said links all converging towards the axis of said cam-device, and guiding means for said links adjacent said cam-device, each of said cams being in the form of a cam-slot and each of said links having a follower-pin engaging in the corresponding cam-slot, the cam slots which operate the plate-setting link and the link for setting the shift-rail frame having radial terminal portions to provide for case-shifting the platen, and also to lock said cam-device against rocking movement when the platen is at either of its case-shift positions.

22. A front-strike four-type type-bar double typewriting machine having, in combination, a four-position platen, an up and down movable platen-frame, a rockable shift-rail frame having downwardly-extending portions and having forwardly extending portions carrying the shift-rail for moving the platen-frame to position the platen, the types forming two sets, the two intermediate positions of the platen being lower and upper normal positions and the two extreme positions being lower and upper case-shift positions thereof, a single shift-key lever having a forwardly-movable upwardly-extending arm at the front of, and below the axis of, the shift-rail frame, a rockable shift-key-controlling plate fulcrumed on the shift-rail frame below and forward of the axis thereof and extending upwardly from its fulcrum to rock between limiting positions, a link pivoted at one end to said upstanding arm and pivoted at its other end to the upper portion of said rockable plate to be set thereby at the front or rear of the axis of the shift-rail frame and to the front or rear of the fulcrum-pivot of said rockable plate, for shifting the platen downwardly by the pull of said link at the front of the axis of the shift-rail frame and for holding said rockable plate at its forward limiting position by the pull of said link at the front of the fulcrum-pivot of said plate, or to shift the platen upwardly by the forward pull of said link below the axis of the shift-rail frame and for holding said rockable plate at its forward limiting position by the pull of said link below the fulcrum of said plate, a platen-restoring spring, a rockable spring-setting plate fulcrumed for limited movement on the shift-rail frame below the axis thereof and having an upwardly-extending portion to which said spring is connected to exert a downward pull thereon, said spring being settable by said plate to exert its pull along a line passing to the rear of the axis of the shift-rail frame and to the rear of the fulcrum-pivot of said plate, for returning the platen from its lower case-shift position while maintaining said spring-setting plate at one of its limiting positions, or to exert its pull along a line passing to the front of the axis of the shift-rail frame and to the front of the fulcrum-pivot of said plate, to assist gravity in returning the platen from its upper case-shift position and for maintaining said spring-setting plate at its other limiting position, a manually-operable actuating device movable between two limiting positions, means operable by said actuating device for set-

ting said rockable plates, means operable by said actuating device for rocking the shift-rail frame to set the platen to either one or the other of its normal positions, movable stops settable by said actuating device to limit the return movements of the platen-frame at each of the two intermediate or normal positions of the platen, and fixed stops for the platen-frame for limiting the case-shift movements of the platen.

23. In a front-strike type-bar typewriting machine, in combination, a case-shiftable platen, means for case-shifting the platen downwardly from a normal position to a case-shift position, type-keys to operate the type-bars, a vibrating ribbon-guide at the front of the platen and normally holding the ribbon below the printing-point, means effective in the normal position of the platen to vibrate the ribbon-guide upwardly to cause the ribbon to cover the printing-point when a type-key is depressed and to retract the ribbon downwardly to uncover the printing-point when the type-key is released, the vibrating means being ineffective to vibrate the ribbon-guide in the case-shift position of the platen, and means to hold the ribbon-guide stationary to cause the ribbon to cover the printing-point when the platen is case-shifted downwardly for typing in the case-shift position of the platen without uncovering the printing-point.

24. In a front-strike type-bar typewriting machine, in combination, a platen, a platen-frame, a traveling carriage on which the platen-frame is mounted for downward case-shift movement for case-shifting the platen downwardly, escapement mechanism for the carriage, type-keys to operate the type-bars, a universal-bar frame operable by the type-bars to control the escapement mechanism, case-shifting means for the platen including a shift-rail frame having an up and down movable shift-rail for shifting the platen-frame, a ribbon-guide at the front of the platen normally holding the ribbon below the printing-point in the normal position of the platen, a ribbon-vibrating lever fulcrumed upon the shift-rail frame to partake of the up-and-down movement of the shift-rail, said ribbon-vibrating lever having a forwardly-extending arm connected to the ribbon-guide and having an upstanding arm, a pin carried by said upstanding arm, a ribbon-vibrating member carried by the universal-bar frame and having therein a substantially vertical downwardly-opening slot engaging said pin in the normal position of the platen to vibrate the ribbon-guide upwardly to cause the ribbon to cover the printing-point when a type-key is depressed and to retract the ribbon downwardly to uncover the printing-point when the type-key is released, when the platen is case-shifted said pin being pulled downwardly out of said slot by reason of the downward movement of the fulcrum-pivot of the ribbon-vibrating lever with the shift-rail frame, whereby the ribbon will not be vibrated in the case-shift position of the platen, and a stop to engage beneath the forwardly-extending arm of the ribbon-vibrating lever to hold up the ribbon-guide to cause the ribbon to cover the printing-point without vibrating when the platen is case-shifted downwardly.

25. In a front-strike four-type type-bar typewriting machine, in combination, a four-position platen movable up and down to occupy any one of two intermediate and two extreme positions, type-keys to operate the type-bars, a ribbon-guide at the front of the platen movable therewith between the intermediate and upper extreme positions thereof to hold the ribbon just below the printing-point in each of these three positions of the platen, means effective at each of said three positions of the platen to vibrate the ribbon-guide upwardly to cause the ribbon to cover the printing-point when a type-key is depressed and to be retracted downwardly to uncover the printing-point when the type-key is released, said means being ineffective to vibrate the ribbon in the lower extreme position of the platen, and a stop effective to prevent downward movement of the ribbon-guide when the platen is moved to its lower extreme position, whereby the downward movement of the platen to its lower extreme position will cause the ribbon to cover the printing-point for typing without vibrating the ribbon to uncover the printing-point.

26. In a front-strike four-type type-bar typewriting machine, in combination, a platen, a platen-frame, a traveling carriage on which the platen is mounted to be moved to occupy any one of two intermediate and two extreme positions, type-keys to operate the type-bars, escapement mechanism for the carriage, a universal-bar frame operable by the type-bars to control the escapement mechanism, a shift-rail frame having an up and down movable shift-rail for imparting up-and-down movement to the platen-frame, a ribbon-guide at the front of the platen, a ribbon-vibrating lever fulcrumed upon the shift-rail frame to partake of the up-and-down movement of the shift-rail, said ribbon-vibrating lever having a forwardly-extending arm connected to the ribbon-guide and having an upstanding arm, a pin carried by said upstanding arm, a ribbon-vibrating member carried by the universal bar frame and having therein a substantially vertical downwardly-opening slot slidably engaging said pin to cause the ribbon-guide to move with the platen to hold the ribbon just below the printing-point at the two intermediate positions and at the upper ex-

treme position of the platen, and also to vibrate the ribbon-guide upwardly to cause the ribbon to cover the printing-point when a type-key is depressed and to be retracted downwardly to uncover the printing-point when the type-key is released when the platen is at either of its intermediate positions or at its upper extreme position, the downward movement of the shift-rail frame when the platen is moved to its lower extreme position being effective to withdraw said pin downwardly out of said slot, so that the ribbon will not be vibrated at the lower extreme position of the platen, and a stop engageable beneath the forwardly-extending arm of the ribbon-vibrating lever to hold up the ribbon-guide, so that the movement of the platen to its lower extreme position will cause the ribbon to cover the printing-point for typing without vibrating the ribbon to uncover the printing-point.

27. In a typewriting machine comprising a platen-carriage and front-strike type-bars each extended to carry four types, the types and platen being relatively shiftable or settable to relatively different vertical positions, the carriage comprising a frame having a front bar portion which is elevated and brought forward to clear the extended type-bars; a machine-frame comprising a pair of front posts; a pair of upwardly and forwardly extending brackets attached to the tops of the posts, and a front rail carried at its ends by said brackets at a forward and upward location to clear the extended type-bars and forming a guide for the front bar portion of the carriage.

28. In a typewriting machine comprising a platen-carriage and front-strike type-bars each extended to carry four types, the types and platen being relatively shiftable or settable to relatively different vertical positions, the carriage comprising a frame having a front bar portion which is elevated and brought forward to clear the extended type-bars; a machine-frame comprising a pair of front posts; a pair of upwardly and forwardly extending brackets attached to the tops of the posts, a front rail carried at its ends by said brackets at a forward and upward location to clear the extended type-bars and forming a guide for the front bar portion of the carriage, a front scale-bar and a margin-gage rod also carried at their ends by said brackets in positions to clear the extended type-bars and margin-gage devices carried by said margin-gage rod.

29. In a typewriting machine comprising a platen-carriage and front-strike type-bars each extended to carry four types, the platen being substantially vertically shiftable or settable, the carriage comprising a frame having a front bar portion which is elevated and brought forward to clear the extended type-bars; a machine-frame comprising a pair of front posts; a pair of upwardly and forwardly extending brackets attached to the tops of the posts, a front rail carried at its ends by said brackets at a forward and upward location to clear the extended type-bars and forming a guide for the front bar portion of the carriage, a front scale-bar and a margin-gage rod also carried at their ends of said brackets in position to clear the extended type-bars, margin-gage devices carried by said margin-gage rod, and a stop-setting device for the platen including a rock-shaft journaled at its ends upon the front and tops of said posts in a position to clear the extended type-bars.

30. In a typewriting machine, the combination with a platen, of a single set of type-bars having two sets of types, each set of types having upper and lower case characters, manually-operable mechanism including a pair of cams conditioned in various relative positions to shift and hold a normal position for the platen to either set of types for typing in lower-case characters, means to change the relative positions of said cams, and key-actuated means operable upon the setting of said cams in various relative positions whereby to change and reverse the normal position of the platen to each set of types, to type in upper-case characters.

31. In a typewriting machine, the combination with a platen, of a single set of type-bars having two pairs of types, each pair of types including upper and lower case characters, a platen-shift lever movable between fixed stops, means to shift said platen including relatively movable and connected rocking cam-elements operable by said lever to positively shift and operatively lock the platen for either pair of types to type in lower-case characters, and a case-shift-key operable to change the normal positions of the platen to either pair of types, to type upper-case characters.

32. In a typewriting machine, the combination of typing elements having upper and lower case characters, a platen having a typing position that is shiftable for both case characters, means to shift said platen, ribbon-controlling mechanism including means operable at one position of the platen to vibrate the ribbon, to cover the typing position, and means connected to the platen-shifting means and operable thereby to silence the ribbon-vibrating means and shift the typing position thereof to the stationary position of the inking ribbon.

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