

Dec. 13, 1938.

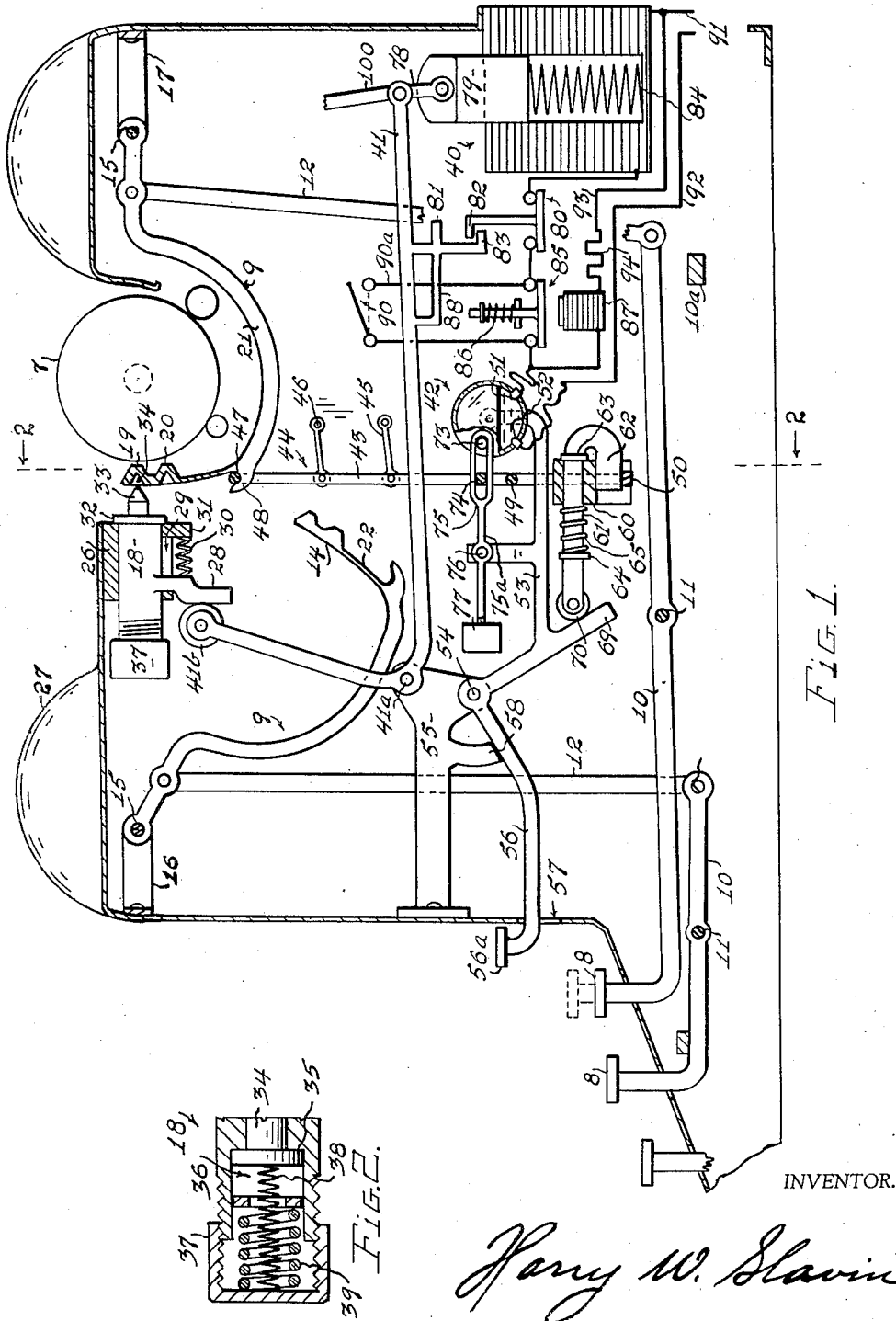
H. W. SLAVIN

2,139,700

TYPEWRITER ACTION

Filed Jan. 27, 1934

2 Sheets-Sheet 1



Dec. 13, 1938.

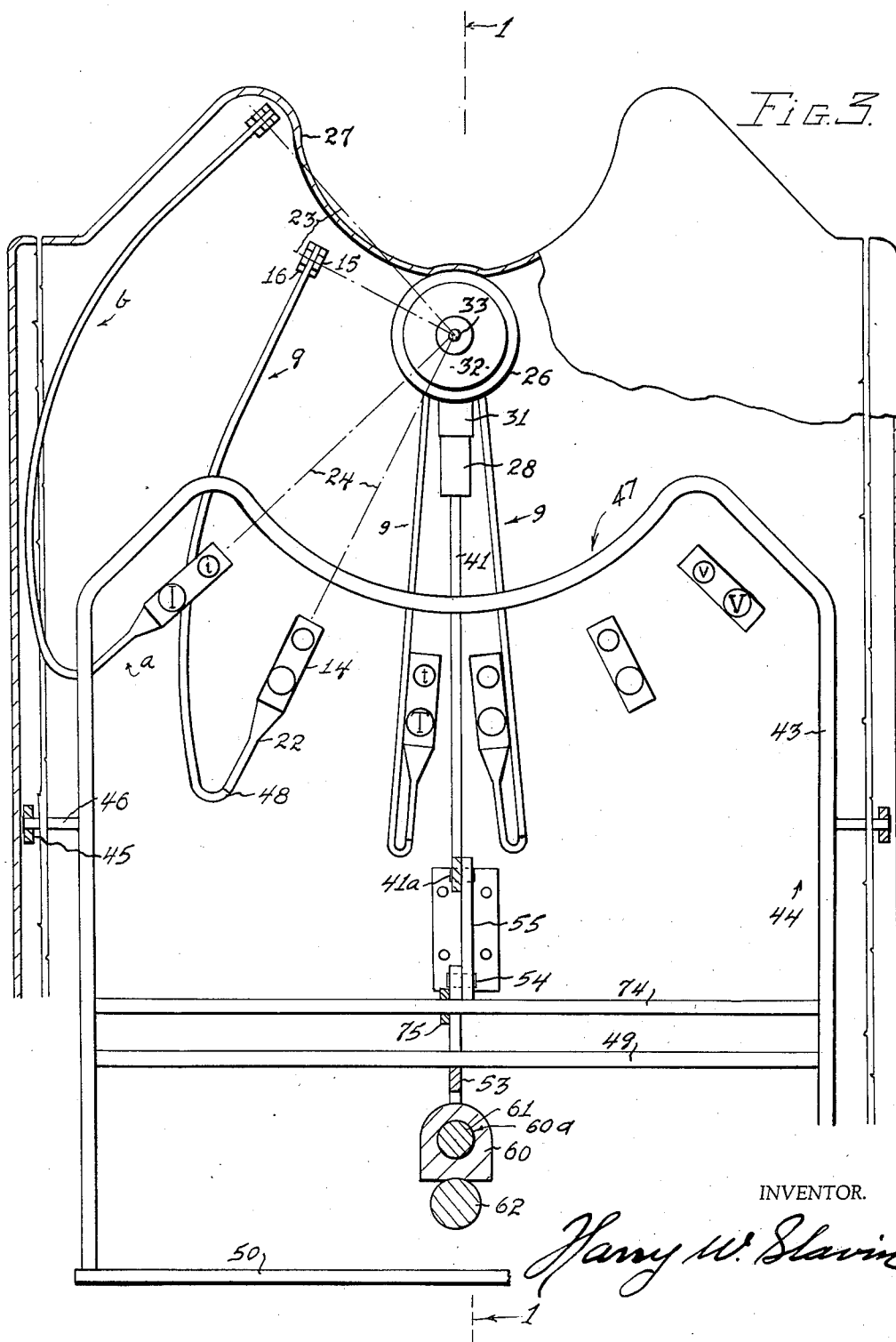
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,139,700

TYPEWRITER ACTION

Harry W. Slavin, Los Angeles, Calif.

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24 Claims. (Cl. 197—23)

The present invention relates to typewriters of the noiseless kind and has among its objects to provide an action whereby slight key movement and correspondingly slight effort on the part of the operator will bring the selected type into position before the platen whereupon extraneous power is brought into action to impress the type quietly but positively against the platen without further effort on the part of the operator.

Another object of the invention is the provision of means for moving the type from the aforesaid position quietly but positively against the platen to make the impression; this being accomplished in the present invention by pressing against the type bar with a predetermined and relatively light pressure until contact is made, whereupon the pressure is materially increased but only after such contact is made. A related object of this invention is the provision of means whereby the pressures employed may be varied at will to suit the operator's requirements and/or to meet varying conditions according to the number of carbon copies to be made.

Whereas in the other types of typewriters it is customary to employ individual motivating means for each key actuated either by the energy imparted by the operator, or actuated by some other power means for each individual type bar, it is an object of this invention to provide for having a single motivating means or motor for the entire assembly of type bars.

It is understood that in all typewriters all of the type shall be capable of being moved into the same printing position and this necessitates a peculiar arrangement of the pivots of the type bars. It will also be understood that in any typewriter accurate alinement and suitable impression are accomplished only by having the motion or path of travel of the type truly normal to the platen at the time the type strikes. In the older types of machines movement of the type from rest position to contact with the platen is along a continuous path and is a single movement. In the noiseless type of machine there are two paths of motion; the first being from rest position to non-printing position before the platen, and the second being from non-printing position to printing position, this compound motion requiring the provision of peculiar and complicated pivot arrangements.

It will be apparent hereinafter that the greatest accuracy in alinement and impression can be best obtained by having the type bar move from non-printing position to printing position in a path normal to the platen surface where the im-

pression is to be made while the path of motion of the type bar from rest position to non-printing position shall be such that when viewed from directly forward of the said position it appears as a straight line.

The aforesaid compound motion on the part of each type bar is an object of this invention. In carrying out the present invention a plunger or the like is provided forwardly of the printing position and adapted for movement in a path normal to the platen while normally spaced a slight distance away. This provides a space, known as the non-printing position for the type, into which a type is first moved. When a type bar has moved to this position it is arrested and held. The type proper, on each bar, are connected to and carried by the bar proper thru the medium of a spring element, which without further movement of the type bar as a whole permits of the type being moved from non-printing to printing position by the aforesaid plunger.

In keeping with some of the foregoing objects and to provide the required compound motion on the part of the type, the pivot points of the type bars are arranged in a novel manner peculiar to this invention. Specifically this arrangement is such that when viewed along the line of travel of the type and plunger from non-printing position to printing position, lines drawn axially of the respective pivots all intersect the said line of travel.

By this arrangement, each type-carrying end of each bar, when viewed from along the line of travel of the plunger, appears to move in a straight line from rest position to non-printing position and to cross the printing position while moving in a straight line; or in other words viewed from along the line of travel of the plunger the paths of travel of all type bars from rest position to non-printing position appear as straight line radial paths all intersecting at the line of travel of the plunger. Each type of course moves in an arc about its pivot and when viewed from a point axial to the pivot the path of travel from rest position to non-printing position appears as an arc which has closest proximity to the platen at the printing position.

While the aforesaid arrangement of pivotal points for the type bars is ideally suited for use in connection with the spring mounted type and the straight-line-motion plunger for moving a selected type from non-printing to printing position it also permits of providing more than one type on each type bar. Such in fact is an object of the invention and in this connection the inven-

tion provides for shifting from low case letter to high case letter without movement of the type bar assembly as a whole, and, without movement of the platen. In such case each type bar is provided with both a high case letter and a low case letter; these being disposed arcuately with respect to the pivot point of the type bar. Since the path of travel of the type-carrying end of each bar is as heretofore explained, the particular type on the bar which is to stop in non-printing position is pre-selected by predetermining the degree of arc thru which the type bar is moved before the plunger goes into action.

Compact design is another object of this invention and provision is made for mounting one-half of the type bars forwardly of the platen and the remainder to the rear thereof.

Another object of the invention is the provision of a single extraneously energized motor for moving the selected type from non-printing position to printing position and for supplying the power required to make a quiet but positive impression so that the only energy required to be furnished by the operator is the relatively negligible energy required to move the type bar from rest position to non-printing position.

In typing it is often required that one type shall be repeated many times and it is therefore another object of this invention to provide for repeating by the mere act of holding down on a repeat key while holding the corresponding type key depressed. The present invention provides a mechanism in which movement of a type to non-printing position acts to energize a motor which in turn actuates the plunger once only and normally will not act to again move the plunger until the key has been released. The depression of a repeat key however acts to cause the motor to continually reciprocate the plunger so that when a type is held between the plunger and the platen it is repeatedly impressed upon the platen. The usual mechanism for moving the carriage step by step is of course provided and in conformity with this invention the carriage is moved, not at each type movement, but after each plunger operation.

Where the plunger is operated electrically it is proposed to have each type bar, just as it moves its type, or the preselected one of its plurality of type, into non-printing position, act to close a circuit to energize the motor and plunger.

The foregoing, and other objects are carried out by a specific form of machine about to be described as illustrative of the invention. This specific embodiment of my invention is shown by the accompanying drawings in which;

Figure 1 is a schematic vertical sectional view taken mainly along the line 1—1 of Figure 3.

Figure 2 is a longitudinal sectional view of the plunger.

Figure 3 is a schematic vertical sectional view taken mainly along the line 2—2 of Figure 1 and showing the arrangement of type bars and pivots peculiar to this invention.

More specifically, 7 indicates the usual platen and the numerals 8, 8, etc., indicate the usual keys. Figure 1 is taken along a line centrally of the machine and to avoid confusion of lines this view shows only those two type bars 9, 9 which are immediately to one side of the center line of the machine; while Figure 3 shows several of the type bars 9, 9, etc., of a group. While any suitable connection between type bar and corresponding key may be employed, these drawings show the conventional connections comprising

the key bar 10, 10; the fixed pivots 11, 11 for the key bars; and the links 12, 12; one for each type bar and connecting the corresponding type bar to the corresponding key bar so that depression of a key raises the type carrying end 14 of a bar from rest position to non-printing position. In Figure 1 the type bar which is mounted rearwardly of the platen is shown raised to non-printing position with the corresponding key depressed, while the type-bar which is mounted forwardly of the platen is shown in rest position. The usual stops, such as 10a, are provided for the bars 10.

Each type bar is provided at the end remote from the type with an individual pivot pin 15; the group of bars mounted to the rear of the platen being carried by the hanger 17 and the group forwardly being carried by the hanger 16. The plunger is indicated at 18 and its line of travel is horizontal. The type bars are shown as each carrying two type 19 and 20 respectively, and in this case one is a high case letter and the other a low case letter. These type are arranged with their faces arcuately disposed to the pivot of the type bar so that either one when stopped in line with the plunger will be in proper and closest proximity to the platen. The intermediate portions 21 of each bar are bent to avoid interference with adjacent parts when moved from rest position to non-printing position. The type of each bar are connected to the bar by the flat spring 22 which permits of a type being moved from the non-printing position in which one is shown in Figure 1, into contact with the platen without further movement on the part of the type bar.

The arrangement of all type bars is best understood by reference to Figure 3. In each group of type bars (the diagram Figure 3 shows only one of the two groups) the pivot pins are inclined, as heretofore mentioned, so that viewed from along the line of travel of the plunger, lines 23 extended from the pivot pins and axial thereto, all intersect at this line. In this diagram the lines 24 indicate the paths of travel of the respective type-carrying ends of the bars and these all appear, when viewed along the line of travel of the plunger, as straight lines all radial to the printing position and these lines also all intersect the lines 23 at the same point and at right angles thereto. Thus it becomes apparent that notwithstanding the respective rest positions of all type bars their advance toward the printing position is such that whether one type or a plurality of type are provided on each bar the preselected type when stopped in printing position is in closest proximity to the platen while the type, the spring 22, and the other parts of a type bar are all then so arranged that the advance of the plunger toward the platen will move the aligned type into contact with the platen in a direction which the spring 22 will most readily permit and which will insure a non-blurring impression, and which direction of motion the type bar will permit without tendency for distortion.

While other arrangements of type bars and pivots, with respect to printing position and line of travel of the plunger, may be employed with the remainder of the mechanism shown, this requires peculiar and abnormal offsets on the part of the type face, type bars, etc., while the arrangement shown in Figure 3 is ideally suited to this embodiment. Further reference to Figure 3 shows each type bar to consist of the portions a 75

and *b* respectively; the portions *a* adjacent the type-carrying end are all the same and only the portions *b* are peculiarly offset while this offset portion is so arranged that the pivot or axis of a type bar is normal to the portion *a* of the bar and to the path of travel of the type. Since the two type bars shown in Figure 1 are close to the center of the machine, their pivots are correspondingly close to the horizontal plane while the outermost of the type bars shown in Figure 3 have their pivots inclined from the horizontal plane to the same degree that their type-carrying ends are inclined from the vertical. This arrangement also provides for all type-carrying ends being disposed in rest position in an arc described around the printing position so that all ends in rest position are equidistant from the position at which they are to be impressed upon the platen. The radius of the arc upon which they are disposed, as in any typewriter, depends upon the width of the type and the number of bars. By disposing the total type-bars of the machine in two groups, as shown, the distance from rest position to non-printing position is reduced materially in keeping with objects of this invention. It is a peculiarity of this machine that all type on all bars and in all operating positions, are invariably vertical and all parallel to one another.

The plunger is mounted to reciprocate in a sleeve 26 and this sleeve, which is fixed, is here shown as carried by the casing or housing 27 of the machine. A finger 28 projects from said plunger thru a slot 29 provided in the sleeve while a spring 30 is compressed between said finger and a lug 31 on the sleeve; the spring acting to hold the plunger in retracted position. A shoulder 32 on the outer end of the sleeve limits retractile motion beyond the position shown. The plunger is provided with a tapered forward end 33 adapted to enter a socket 34 provided in each type bar for each type. Preferably the plunger is of the construction shown in detail in Figure 2 and in which the end 33 is carried by an inner plunger 34 projecting thru the outer end of the plunger proper. This inner plunger is mounted to reciprocate relative to the outer plunger and is provided with an inner annular enlargement or flange 35 which is disposed within an enlarged bore 36 of the outer plunger. A cap 37 is screw threaded over the outer or rear end of the outer plunger and holds a coiled spring 38 compressed between itself and the shoulder of the inner plunger. A larger, stronger and shorter spring 39 is disposed within the bore 36 arranged to be abutted by the inner plunger after it has been moved to compress the smaller spring.

To actuate the plunger at the correct time, novel electrical equipment is provided comprising the solenoid motor 40, the lever 41 with its roller, 41b, the cup-switch 42, the switch-frame, 44, and other parts about to be described. These parts are all shown diagrammatically and each part in itself, with the exception of the switch frame, is well known in the electrical art. The switch frame is provided with spaced side bars 43; one to either side of the machine and these are carried by parallel links 45, pivoted to the casing at 46 to permit practically vertical reciprocation on the part of the frame. This frame includes an upper contact bar 47 of arcuate form extending across the machine in such a manner that the hook 48 provided on each type bar shall engage same just as the first type of any selected type bar moves its type close to non-printing position. The frame also includes an intermediate cross

bar 49 disposed to contact a fixed member about to be described to limit its downward movement.

It will be understood that side bars 43 above the links are to be sufficiently flexible to accommodate themselves to the slight arc thru which the hook 48 may carry them after the hook has engaged. A lower cross bar 50 is provided in the frame to abut a member to be later described, to limit the upward movement of the frame.

The cup-switch is of the oscillating type containing mercury and two contacts 51 and 52 respectively so arranged as to close a circuit when the cup is in the position shown and to break this circuit when rocked to a position where one contact is moved out of the mercury. The switch is preferably of glass so that it becomes its own insulator between contacts and so that the mercury does not adhere to inner surfaces.

In keeping with salient objects of this invention the switch is mounted on a shift-key bar 53 which is pivoted as at 54 to a fixed bracket 55 carried by the casing, and which bar continues as at 56 to a shift key 56a. A slot 57 in the casing limits the downward movement of the shift key, while a stop 58 carried by bracket 55 limits upward motion of this bar. This bar forms the adjustable stop for the intermediate cross bar 49 of the switch frame.

A double stop, having a plurality of stop positions according to the number of type on a type-bar, is provided as an upper limit for the lower cross bar of the switch frame. This comprises the fixed block 60 provided with a bore 60a thru which a rod 61 extends. The rod is involuted and turns back under the block as at 62 to normally increase the effective depth of this block. The rod is provided to the rear of the block with a shoulder 63 limiting forward movement. Forwardly the rod is provided with a spring seat 64 and between this seat and the block a spring 65 is compressed. Movement of this rod rearwardly against the spring tension will move the end 62 away from over the cross bar of the switch frame, allowing the frame to be raised a greater distance and in which case the block itself becomes the upper limiting stop for the lower cross bar of the switch frame.

An extension 69 on the shift-key bar is provided and disposed to bear against the outer roller end of the bar 61, so that when the shift key is depressed to change the elevation of the mercury switch and to lift the switch frame and thereby change the lower stop limit, the upper stop is accordingly changed.

The cup-switch is provided with a projecting pin 73 as is also the switch frame as at 74 and these are joined by a slotted yoke 75. This yoke is provided with a continuation 75a pivoted to the shift key bar as at 76 and the outer end of this is counter-weighted as at 77 to partially balance the weight of the switch frame.

Normally, or except when the shift-key bar is moved, this shift-key bar is a fixed element and is held in the position shown by the action of the spring 65. Since this is fixed and one end of the yoke is pivoted to the shift-key bar, any motion of the switch frame relative to the shift-key bar will rock the mercury cup accordingly.

The lever 41 at one end rides upon the finger projecting from the plunger and the other end of this lever is linked as at 78 to the core 79 of the solenoid motor, while an intermediate part of the lever is pivoted to the fixed bracket 55 as at 41a. Thus energization of the motor draws

the core down and rocks the upper roller end of the lever to force the plunger against the type, and to then force the type against the platen.

The solenoid is provided with its usual lost-motion relay switch 80. This switch includes the two spaced lugs 81 and 83 which are carried by the lever to move with the core and between these lugs is disposed the lug 82 carried by the switch proper. It is understood that when the solenoid is energized and the core is pulled down against its return spring 84 the upper lug 81 strikes 82 just as the stroke is completed and breaks a circuit so that the solenoid is deenergized and the core allowed to be returned to normal position by the spring. Just as the core reaches normal, however, the lug 83 strikes lug 82 and raises the switch to again close the circuit. This type of solenoid and switch is well understood and will normally impart constant reciprocation to the core and the plunger if allowed to function in the normal manner.

A second switch however is provided as at 85 and this switch is of the type which is held closed normally by a spring 86, but once opened by being depressed is held open by an electro-magnet 87 of such strength as to hold same open but incapable of pulling the switch from closed to open position. A bar 88 is provided on the lever 41 so arranged as to strike this switch at the same time that lugs 81 strikes the first named switch to open it. A short is thrown around the switch 85 to render it inoperative when required; this short being in the form of the repeat switch indicated at 90 and the lead such as 90a and shown in Figure 1 in open position so that switch 85 is effective.

One feed wire 91 is connected to one side of the solenoid while the other feed wire 92 extends to that contact 52 of the mercury switch which is at all times submerged in mercury. From the other contact 51 of the mercury switch connection is made thru the switch 85 and thru the relay switch back to the solenoid. A line 93 is provided connecting contact 51 of the mercury switch to the feed line 91 so that this line is energized at all times that both contacts are in mercury but de-energized only when the one contact is out of the mercury. In this line is incorporated the electro-magnet 87 but resistance is also provided in this line as at 94.

The action of the electrical parts is as follows:—When the mercury switch has moved to the position shown to close the circuit described the solenoid is energized and also the electro-magnet 87. The drawings show the parts just at the interval when the core of the solenoid starts to descend and the lugs on the relay switch are shown as just having been moved apart slightly. Now as the core continues down both the relay switch 80 and the switch 85 become opened by being depressed as explained, and the electro-magnet 87 acts to keep switch 85 open. As the core reaches lower position, and has acted on the plunger 18 thru its lever 41, and has broken the circuit thru switch 80 the solenoid is deenergized and the core returns to normal allowing the plunger and lever to return to normal. However as long as both contacts in the mercury switch are under mercury and in the position shown, the electro-magnet 87 acts on switch 85 to keep the circuit broken thru the solenoid and the solenoid will not be energized again.

The mercury switch is shown as being held in the position shown in Figure 1 by the hook 48 of a type bar holding the switch frame in the

position shown to hold the mercury switch in the position shown. When, however, the type-bar is released by the operator and is allowed to gravitate to normal position, it leaves the switch frame free to drop until the intermediate cross bar 49 thereof comes to rest upon the shift-key bar. The resultant rocking of the mercury switch by reason of the descent of the switch frame and the slotted yoke 75 results in the circuit thru the electro-magnet 87 being broken so that the spring on switch 85 returns this switch to normal position and the parts are all ready for another impulse.

With all of the electrical parts in the position shown and with all type bars in rest position as in Figure 3 so that the switch frame is free to drop until the intermediate cross bar 49 thereof has stopped against the shift-key bar, and so that the contact 51 of the mercury switch is in circuit-opened position, the parts are ready for operation.

Depression of any key will raise the corresponding type bar so that the lower case letter thereof will be moved to non-printing position. As it so moves the corresponding hook engages the upper cross bar 47 of the switch frame and the mercury switch, thru the medium of the slotted yoke, moves to close its circuit. During this time, and except when high case letters are to be printed, the shift-key bar is in the normal position shown in Figure 1.

The mercury switch becomes effective on the solenoid, and the plunger is moved toward the platen just at the instant that a socket in the type to be printed aligns with the pointed end of the plunger and the plunger moves in to engage this socket and stop the rise of the type bar. At the same instant, however, and as a secondary means of stopping the type bar, the lower cross bar of the switch frame strikes the end 62 of the bar 61 and stops.

The plunger proper continues to move and the type is pressed quietly against the platen with a force corresponding to the compression force of the lighter spring in the plunger over the slight resistance of the leaf spring on the type bar. By this time the outer plunger has progressed toward the platen until the end of the inner plunger is contacted by the heavier shorter spring whereupon pressure on the type is materially increased.

In this manner the type is first quickly but quietly pressed against the platen and immediately this is done pressure is materially increased so that suitably strong impression is made without a sudden blow being struck, and even when relatively high pressure is applied all this energy is provided by the solenoid motor while the only duty of the operator is a very negligible supply of energy to lift the type to position. Usual counter-balancing expedients (not shown) may be employed to render movement of the type bars as effortless as well balanced parts will provide.

Immediately the plunger has done its work it is released but all electrical parts return to normal only when the key and type bar are released.

At any time that "repeating" is required, the switch 90 around the switch 85 is closed, whereupon the switch 85 is cut out of operation and the usual solenoid switch 80 will act to repeatedly actuate the plunger so long as a type bar is held in position. A link 100 is shown connected to the core of the solenoid, this being what is known in typewriters as the carriage release. Such

mechanism is well understood and not here shown but the distinction in this embodiment is that the carriage release is operated for each impulse of the plunger and not for each type-bar movement.

To understand the operation of the shift-key bar assume all parts to be in normal position with the switch frame dropped to normal so that the mercury switch is in open position, and the intermediate cross bar 49 of the switch frame is resting upon the shift-key bar, and the lower cross bar of the switch frame is dropped below stop 62.

Now the shift-key bar is depressed as far as it will go so that the part of the shift-key bar carrying the mercury switch is raised. This raises the switch frame and the mercury switch correspondingly without any relative motion between the two and the switch remains in open position since it cannot close a circuit except by being moved relative to the switch frame. At the same time that the switch frame and the switch are raised the stop 62 is moved out from over the lower cross bar of the switch frame. This disposes the upper cross bar of the switch frame in a higher position than heretofore so that when a type key is depressed to move a type bar upwardly the hook of the type bar will engage the switch frame to raise the switch frame relative to the shift-key bar only at such time that the lowermost type on the bar shall have aligned with the plunger. At the same time the lower cross bar of the switch frame will strike the block 60 only when the said lower type (which will be an upper case letter) has reached alinement with the plunger.

Whether the shift-key bar is in normal position shown in Figure 1, or in elevated position by depression of the shift key, the action of all electrical parts is the same, the only action on the part of the depressed shift-key being to delay the action of the switch until the type bar has moved the lower position (upper case) type into position, and to permit the lower cross bar 50 of the switch frame to rise sufficiently. In other words it is the relative motion of the switch frame to the shift key bar that energizes and deenergizes the electrical instrumentalities.

While I have shown and described a specific embodiment of my invention, this is done only by way of example and it is understood that the construction and relative disposition of the parts is shown mainly in diagram to illustrate the action. I may employ any suitable equivalents of the parts here shown or otherwise alter the design, construction and arrangement of parts within the appended claims without departing from the spirit of my invention.

I claim:

1. In a typewriter, movable type, a platen, means for selectively moving a type into non-printing position adjacent said platen, motor driven means for moving the type from such position against said platen, and means movable to energize said motor driven means and disposed to be contacted by a type moving to non-printing position.

2. In a typewriter, movable type, a platen, manual means for selectively moving a type into non-printing position adjacent said platen, motor driven means for moving the type from such position against said platen, and means movable to energize said motor driven means and disposed to be contacted by a type moving to non-printing position.

3. In a typewriter, movable type, a platen, means for selectively moving a type into non-printing position adjacent said platen, motor driven means for moving the type from such position against said platen and an energizing switch for said motor disposed to be contacted by a type moving to non-printing position.

4. In a typewriter, movable type, a platen, manual means for selectively moving a type into non-printing position adjacent said platen, motor driven means for moving the type from such position against said platen, and an energizing switch for said motor disposed to be contacted by a type moving to non-printing position.

5. In a typewriter of the class described, type, means for selectively moving said type to dispose any one type in position before a platen, a plunger, an inner plunger contained and reciprocable in said plunger and having a protruding end disposed to engage a type in such position to center same and force it against said platen upon corresponding movement of the first named plunger, means for so moving said first named plunger, a light spring carried by the first plunger bearing against the second plunger, and a shorter heavier spring carried by said first plunger and positioned to engage said second plunger when the light spring is compressed a given degree.

6. In a typewriter of the class described, a platen, type, means for moving a selected one of said type into position adjacent said platen, electrically energized means for moving said type from such position into printing contact with said platen, a switch movable to energize said means, switch engaging means carried by said type disposed to operatively engage said switch as the corresponding type moves to said position, a relay switch to de-energize said type moving means, and means for rendering said first named switch inoperative until a positioned type has been retracted from such position.

7. The typewriter as in claim 6 and further including a repeating switch for rendering said last named means inoperative.

8. In a typewriter a transversely extending platen, type bars some being pivoted forwardly of said platen, and others pivoted rearwardly of said platen; said bars having type-carrying ends and all arranged and pivoted to move their type to one given position adjacent said platen, means for so moving said bars, separately energized means for moving a type from such position into printing contact with said platen, a switch for energizing said means disposed adjacent said position in the path of travel of all of said type bars.

9. In a noiseless electric typewriter, a platen, type bars each having a type carrying end, means for moving any one of said ends into position adjacent said platen, a plunger adjacent said position movable to force a type bar end from said position into printing contact with said platen, a solenoid core, a solenoid winding acting when energized to retract said core, a spring for returning said core, a lever connecting said core with said plunger to advance said plunger when said core is retracted, an energizing switch for said winding, means on each of said type bars to operatively engage said switch when moving to said position and for releasing said switch when returning to rest from said position, a relay switch for de-energizing said winding when the core is retracted, a second switch connecting said energizing switch and said relay switch, means operable upon retractile movement of said core to open the last named switch, and means for

holding said last named switch open until a positioned type bar shall have returned to rest position and released said energizing switch, and means carried by said core to close said relay switch upon return of said core by said spring to normal position.

10. In a typewriter as in claim 9 and further including means for shorting said second switch to render said relay switch operative to provide constant reciprocation of said core while a positioned type bar acts to hold said energizing switch closed.

11. In a typewriter of the class described the combination of; a fixed type bar pivot, a platen, a type bar mounted to swing on said pivot and movable to position its type carrying end in forwardly spaced relationship to said platen, means for holding the bar in such position, means for forcing the type carrying end of said bar into printing contact with said platen, the first named means normally disposed to be engaged by a passing type moving into said position and thereby movable to bar-holding position, said first named means operating on such movement to energize the second named means, and a spring incorporated in said bar intermediate said pivot and said end.

12. In a typewriter of the class described, a platen, a plurality of type bars having type carrying ends normally disposed below said platen, pivots for said bars positioned to cause said bars to move their type carrying ends all across a position just forwardly of said platen, motor driven means forwardly of said position to be energized to force a positioned type from said position into printing contact with said platen, a switch for energizing said means, means for so moving said type bars to carry any selected type to said position in a substantially vertical path, a switch frame movable to operate said switch and having an upper extent disposed adjacent said position, and hooks, one for and on each type bar to engage said extent to raise said switch frame to operate said switch as the corresponding bar moves its type to said position, and a stop for said switch frame acting as a stop for an engaging type bar.

13. The typewriter as in claim 12 and further including other type on said bars arranged to come into such position upon movement of the corresponding bar a greater vertical distance than normally required to position the first named type, and a shift key for changing the normal position of said switch and said switch frame; said key operable to elevate said switch frame and said switch.

14. In a typewriter of the class described, a platen, a type bar having type disposed below said platen and said bar movable in a generally vertical direction to dispose a preselected one of said type in given position forwardly of said platen, means for forcing a positioned type against said platen; said means comprising an electrically operated plunger, an energizing switch for said means disposed to be engaged and operated by the type bar as same moves to position one of its type, and means for predetermining the type to be pressed against said platen comprising means for varying the elevation of said switch.

15. In a typewriter the combination of a platen and means defining a non-printing position forwardly of said platen, a plurality of arcuate type bars each having a plurality of type successively arranged thereon; pivots, one for each

bar and each arranged concentric to the corresponding type and with respect to the other bars so that predetermined limited movement of a selected bar on its pivot will bring a selected one of the type into non-printing position without interference with other bars; means for imparting predetermined limited motion to said bars to move same individually and selectively into said non-printing position, and motor operated means for providing relative printing motion between said platen and a type stopped in non-printing position and rendered operative by a type bar moving a type into non-printing position.

16. In a typewriter a platen, a plunger spaced forwardly of said platen and movable along a given line normal to said platen and toward said platen and providing a non-printing position between said plunger and platen, type bars having type carrying ends normally remote from said non-printing position and movable through respective paths all converging at said non-printing position and passing through said position in directions at right angles to said line, and pivots one for each type bar; said pivots all inclined and each inclined along a line intersecting the corresponding path of travel of the corresponding type carrying end at a right angle and on the said line, the type carrying end of each bar being curved to be co-axial to the corresponding pivot, each type carrying end of a type bar including a flat spring connecting the same with the corresponding bar.

17. In a typewriter, a platen, type bars having type carrying portions movable in different planes radiating towards a common point adjacent and in front of said platen, a plurality of type arranged in successive positions on the type carrying portions of said bars for movement selectively into a common initial position opposite a point on said platen preparatory to a printing operation, means for selectively actuating said type bars, means for stopping any preselected type of any of said bars in said initial position, and motor operated means effective on the final movement of said type to initial position and rendered operative by the bar for said type for moving the type to printing position.

18. In a typewriter, a platen, movable type bars each having a plurality of type on the free end thereof for movement into a common initial position adjacent a point on said platen, means for selectively actuating said type bars, means for stopping the movement of said type bars so as to selectively position said type in said initial position, and means effective by and upon the final movement of said bars for moving said preselected type from initial to printing position; said type bars being separately pivoted and having axes radially disposed at right angles to a line which is normal to the platen through the printing position and so that adjacent bars will be disposed at relatively acute angles.

19. In a typewriter, a platen, movable type bars each having a plurality of type on the free end thereof for movement into a common initial position adjacent a point on said platen, means for selectively actuating said type bars, means for stopping the movement of said type bars so as to selectively position said type in said initial position, and means effective upon the final movement of said bars for moving said preselected type from initial to printing position; said type bars being separately pivoted and hav-

ing axes radially disposed at right angles to a line which is normal to the platen through the printing position and so that adjacent bars will be disposed at relatively acute angles, the axes of said type bars being also at right angles to the planes of paths of movement of the type carrying ends of said bars.

20. In a typewriter, a platen, movable type bars each having a plurality of type on the free end thereof for movement into a common initial position adjacent a point on said platen, means for selectively actuating said type bars, means for stopping the movement of said type bars so as to selectively position said type in said initial position, and means effective upon the final movement of said bars for moving said preselected type from initial to printing position; said type bars being separately pivoted and having axes radially disposed at right angles to a line which is normal to the platen through the printing position and so that adjacent bars will be disposed at relative acute angles, the pivoted ends of said type bars being offset from the plane of the type carrying ends of said bars.

21. In a typewriter, a platen, movable type bars each having a plurality of type on the free ends thereof for movement into a common initial position adjacent a point on said platen, means for selectively actuating said type bars, means for stopping the movement of said type bars so as to selectively position said type in said initial position, and means effective upon the final movement of said bars for moving said preselected type from initial to printing position; said type bars being separately pivoted and having axes aligned with planes intersecting said common initial position and which extend at right angles to the planes of the longitudinal axes of the type carrying ends of said bars, and the pivoted ends of said bars being offset from the plane of the type carrying ends of said bars.

22. In a typewriter, a platen, type bars having type carrying portions movable in different planes radiating towards a common point adjacent and in front of said platen, a plurality of type arranged in successive positions on the type carrying portions of said bars for movement selectively into a common initial position opposite a point on said platen preparatory to a printing operation, means for selectively actuating said type bars, means for stopping any preselected type of any of said bars in said initial position, and means made effective on the final movement of said type to initial position and by the bar for said type for moving the type to printing position.

23. In a typewriter, a platen, a plurality of type bars, some of which are pivoted at points forwardly of the platen, and the other of which are pivoted at points rearwardly of the platen, and all of which are movable to dispose portions thereof at a common point adjacent to and in front of said platen, type on said portions of said bars, means for selectively moving said bars to dispose type at said common point, and means operating upon movement of said type to said common point for moving said type to a printing position.

24. In a typewriter, a platen, a plurality of type bars, some of which are pivoted on one side of the platen, and others of which are pivoted on the other side of said platen, and all of which have portions movable to a common position adjacent to and on one side of said platen preparatory to movement to a printing position, means for selectively moving said bars to dispose said portions in said common position, type carried by said portions and means for moving said portions towards said platen to dispose the type in printing position, operating upon movement of said type into said common position.

HARRY W. SLAVIN.