July 23, 1929. G. F. HANDLEY 1,722,142

TYPEWRITING MACHINE

Filed Oct. 11, 1927 3 Sheets-Sheet 1

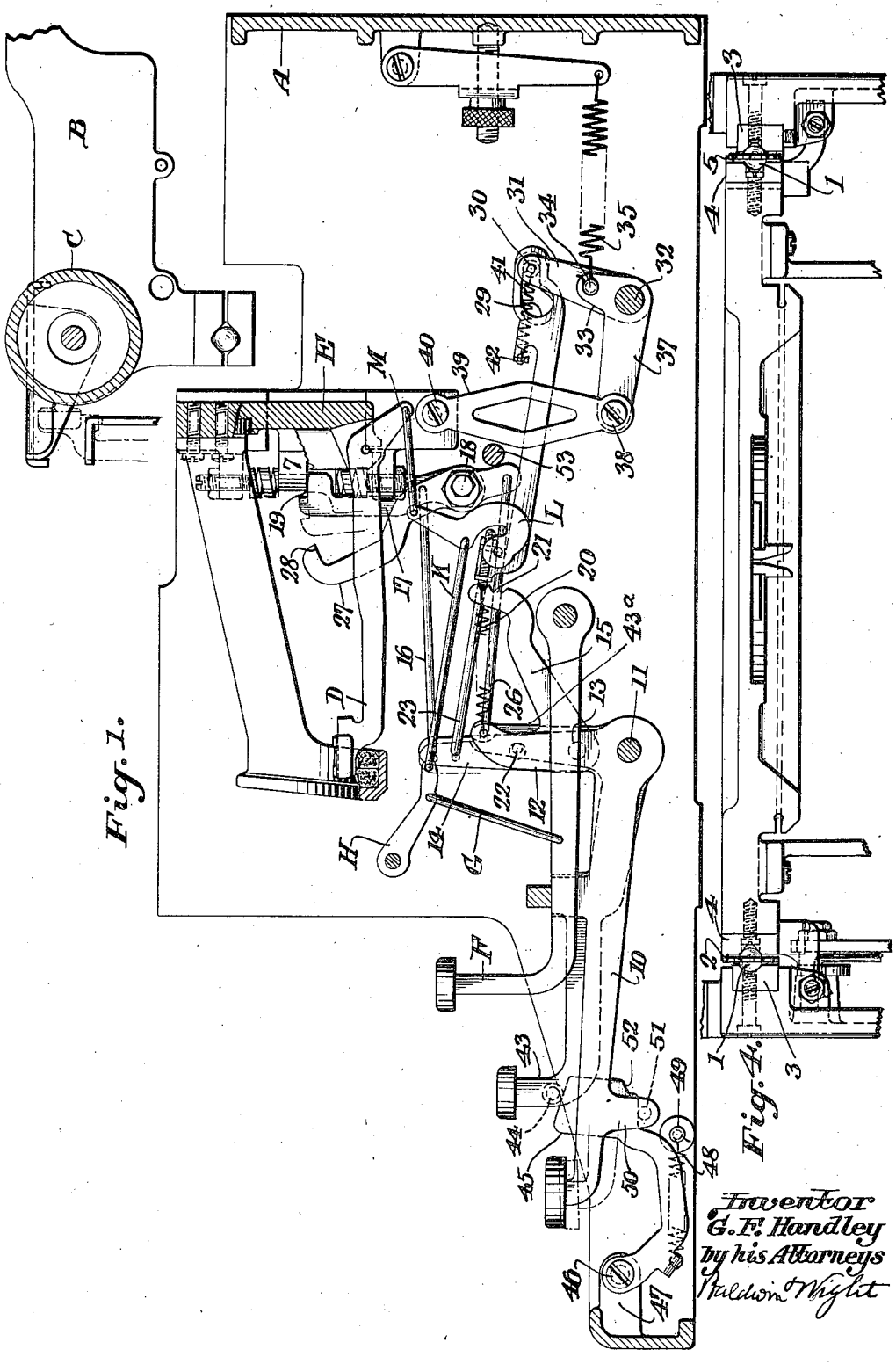


Fig. 1.

Fig. 4.

Inventor
G. F. Handley
by his Attorneys
Baldwin & Wight

July 23, 1929. G. F. HANDLEY 1,722,142

TYPEWRITING MACHINE

Filed Oct. 11, 1927 3 Sheets-Sheet 2

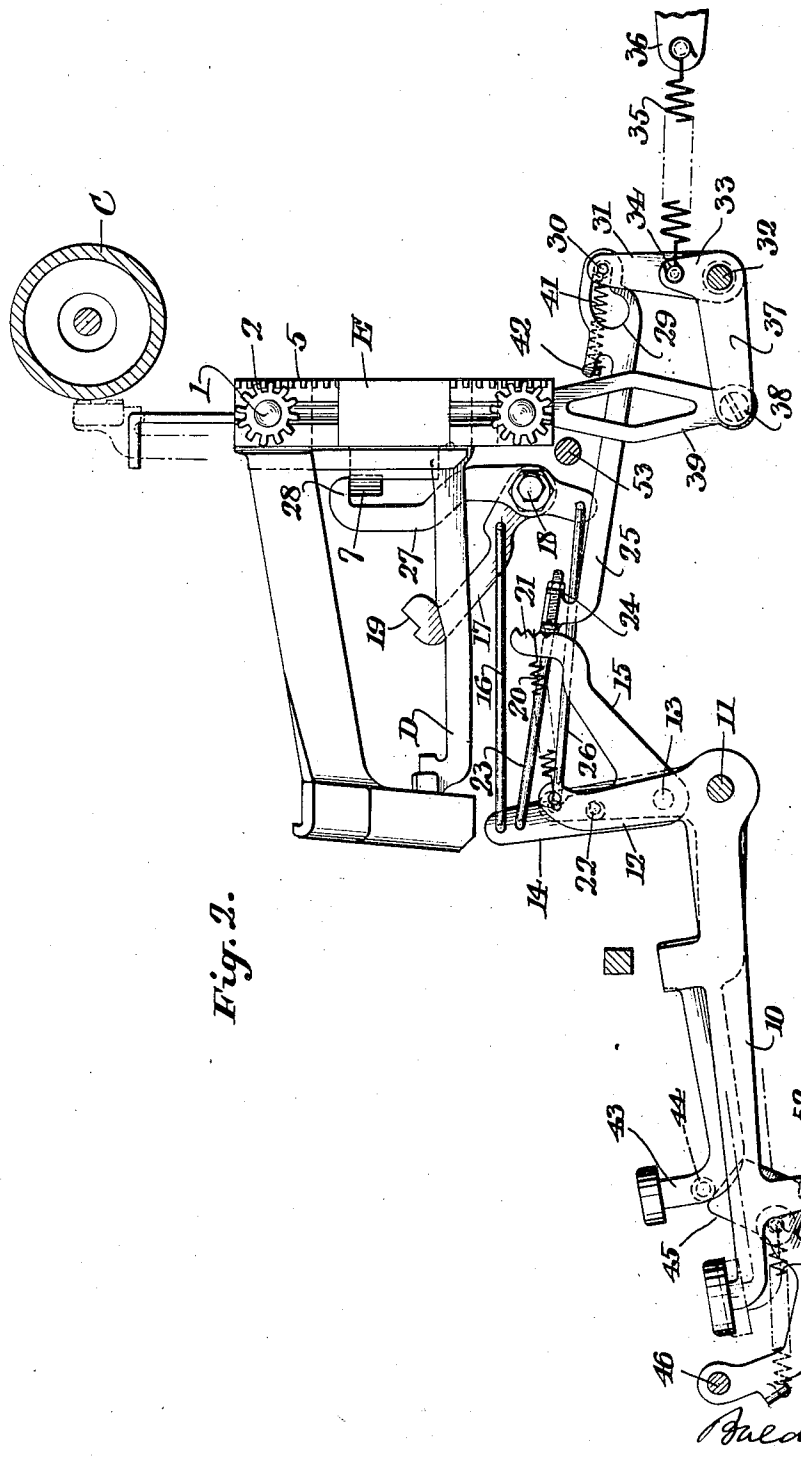


Fig. 2.

Inventor
G. F. Handley
by his Attorneys
Baldwin & Wight

July 23, 1929. G. F. HANDLEY 1,722,142

TYPEWRITING MACHINE

Filed Oct. 11, 1927 3 Sheets-Sheet 3

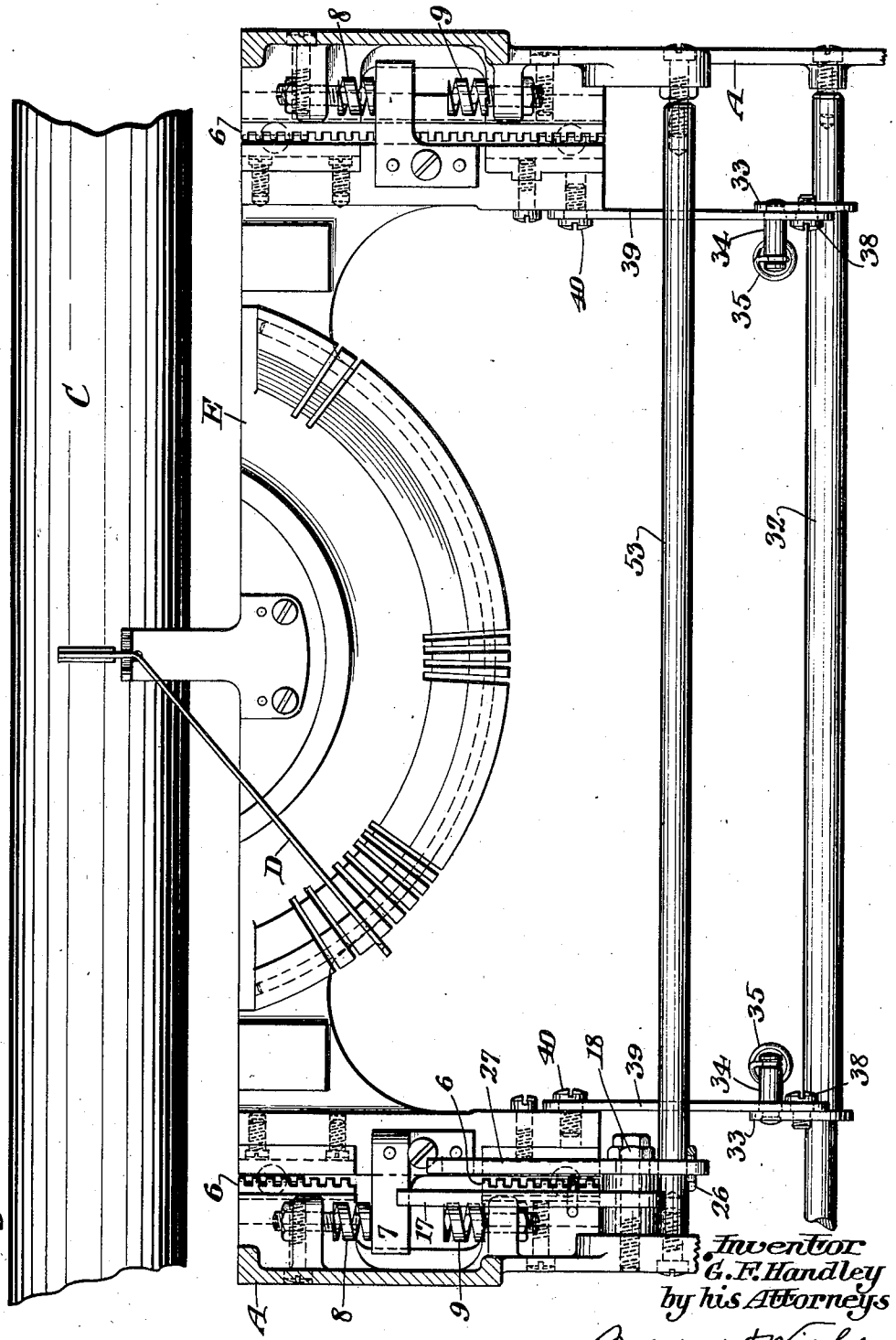


Fig. 3.

Inventor
G. F. Handley
by his Attorneys
Baldwin & Wright

Patented July 23, 1929. 1,722,142

UNITED STATES PATENT OFFICE.

GEORGE F. HANDLEY, OF GLENDALE, NEW YORK, ASSIGNOR TO ROYAL TYPEWRITER COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TYPEWRITING MACHINE.

Application filed October 11, 1927. Serial No. 225,485.

This invention relates to a construction in which the type bar segment is shifted for writing from upper and lower case type and comprises means for locking the segment in normal position and means for shifting and locking the segment in shifted position.

Further features of the invention will be apparent from the following detailed description and set forth in the appended claims.

In the drawings:

Figure 1 is a fore and aft section through a machine with parts in elevation.

Figure 2 is a similar view showing the segment shifted and locked in shifted position.

Figure 3 is a transverse section with parts in elevation.

Figure 4 is a top plan view of the type segment and its supporting parts.

The invention is illustrated as applied to a standard Royal machine, although it is capable of application to other typewriters.

There is shown a portion of the main frame A, carriage B, platen C carried thereby, type bar D, and a type segment E. The type action illustrated comprises a key lever F connected by a link G to a front link H which is connected by a link K to an intermediate member L which is pivoted at one end and has its other end connected by a link M to the heel of the type bar. This type action is shown and claimed in the copending application of L. C. Myers and G. F. Handley, Serial No. 135,904 filed Sept. 16, 1926. While especially adapted for use with a shiftable segment, it is obvious that other forms of type action may be employed if desired.

The segment travels in its shifting movement on balls 1 surrounded by pinions 2 and travelling in race ways 3 and 4 which are provided with rack teeth 5 and 6 meshing with said pinions. The segment is provided with stops 7 which in the normal upper position of the segment engage resilient adjustable stops 8 and in the lower shifted position engage similar stops 9. The particular mounting of the segment is independent of the means for shifting the segment and is described and claimed in my copending application Serial No. 225,231, filed October 10, 1927.

The shift key 10 is mounted on a rock shaft 11 carried by the sides of the machine frame and has an upwardly extending arm 12 to which is pivoted at 13 a bell crank lever having two arms 14 and 15. The arm 14 is connected by a link 16 with a locking member or latch 17 which is pivoted at its lower end on the stud shaft 18 and has a shoulder 19 at its upper end which normally engages beneath the stop 7 to hold the segment in its upper position. A spring 20 is connected at one end to the arm 12 and at its other end is adjustably connected to the end 21 of the arm 15. The arm 12 of the shift key 10 and the arm 14 of the bell crank lever are connected by a pin and slot connection 22, which causes these two parts to move together through the greater part of their movement but permits slight independent movement.

Also connected to the arm 14 of the bell crank lever is one end of a link 23, the other end of which is adjustably connected at 24 to a link 25 whereby the links may be adjusted lengthwise. Connected to the upper end of the arm 43ª of a shift lock key 43 is one end of a link 26 which is connected at its other end to the lower end of a locking member or latch 27 also mounted on the adjustable eccentric stud shaft 18 and having a hook 28 at its upper end which is adapted to engage the upper side of the stop 7 when the segment is in shifted position as shown in Figure 2.

The rear end of the link 25 is provided with a keyhole slot 29 in which fits a pin 30 carried by the upper end of an arm 31 fast on a rock shaft 32 located in rear of the segment. On the rock shaft is a bell crank lever having a short arm 33 provided with a stud 34 to which is connected one end of a counterbalance spring 35, the other end of which is attached to an adjustable part 36 of the machine. The other arm 37 of this bell crank lever is pivoted at 38 to the lower end of an adjustable link 39, the upper end of which is pivoted to the type segment at 40. It is to be understood that the construction just described is duplicated at the two sides of the machine as clearly shown in Figure 3. A spring 41 is attached at one end to the pin 30 and at the other end to an ear 42 on the link 25. The parts are so positioned that the link 25 may be moved

slightly before engaging the pin 30 and transmitting movement to the arm 31.

The shift lock key 43 is provided and the locking mechanism operated thereby as illustrated is substantially that shown in my Patent No. 1,244,729 granted Oct. 30, 1917. The shift lock key lever 43 is loosely mounted on the shaft 11 and has a pin 44 overlying one end of a locking member 45 which is pivoted at its front end at 46 to a projection 47 of the frame of the machine. A spring 48 is connected to an ear on the member 45 and to a stud 49 on the frame and tends to hold the parts in the Figure 1 position. The shift key lever 10 is provided with a projection 50 having a pin 51 which underlies the end of the locking member 45. The under edge of this locking member is provided with a dwell 52 which engages the pin 51 when the parts are moved to the shifted position of Figure 2 and holds the parts in such position.

The drawings also illustrate the adjustable tie rod 53 which is provided at a point below the type segment for the purpose of strengthening the frame of the machine. In the usual construction in which the segment is rigidly attached to the frame of the machine, the segment itself firmly connects the sides of the machine and the tie rod 53 is unnecessary.

It is believed that the operation of the mechanism will be clear but the following points may be briefly noted. When the parts are in the Figure 1 position and the shift key lever 10 is operated, the first part of the movement will produce no effect upon the segment shift mechanism due to the lost motion between the slot 29 of the link 25 and the pin 30 of the arm 31. The arm 14, however, will move immediately and through the link 16 will move the locking member 17 to the dotted line position of Figure 1, thus unlocking the segment for shifting movement. Upon a depression of the shift lock key 43 the same operation will take place and in addition the locking mechanism will be moved to its operative position as shown in Figure 2.

When the segment is in its upper position and the shift key lever 10 is first depressed, the latch 17 will be released from the stop 7 and moved to the dotted line position shown in Figure 1. This releasing movement of the latch 17 is brought about through the medium of the arm 14 on the lever 10, the pin and slot connection between the arm 31, the link 25 and the link 16 which connects the arm 14 with the latch 17 at a point above the adjustable fulcrum 18 of said latch. During this first part of the depression of the shift key lever 10, the segment shift mechanism does not begin to function to move the segment to the lower position until after the latch 17 has been released from the stop 7. This latent movement of the shift mechanism is due to the loose connection between the link 25 and the arm 31 which is formed by the slot 29 and the pin 30. During further depression of the shift key lever 10, the arm 14 will, through the medium of the connected links 23 and 25, rock the arm 31 forwardly together with the shaft 32 against the tension of the spring 35, thereby swinging the arm 37 downwardly and moving the segment E and the connecting link 39 downwardly therewith, and the latch 17 will be swung forwardly from the dotted line position of Figure 1 to the full line position of Figure 2. If the shift key lever 10 is then released, the parts will return to their normal positions as shown in Figure 1, the segment E being moved to upper position and the associated mechanism being returned by the spring 35 which was tensioned during the movement of the segment to lower position. After the segment has been moved to its lowest position, by reason of the pin and slot connection 22 between the arms 12 and 14, the spring 20 is tensioned permitting further movement to cushion the key lever 10, and also for the purposes hereinafter described.

A further latch 27 is also provided to insure the segment E being positively held to secure perfect alinement of types when it is desired to print only those characters that are positioned for printing when the segment is in its lower location.

When the shift lock key 43 is depressed, the latch 27 will be swung rearwardly by the arm 43a of the key 43, through the medium of the link 26, which is connected to the latch at a point below the fulcrum 18 thereof; from the full line position shown in Figure 1 to the full line position in Figure 2, wherein it will engage above the stop 7 after the segment has been completely moved to its lower location. Therefore it will be seen that the segment is locked in its lower location by two separate means, the latch 27 and the shift key locking mechanism.

To release the segment from its lower locked position, pressure applied to the shift key 10 will move that part from the full line to the dotted line position shown in Figure 2, said movement being permitted by the pin and slot connection 22, at which time the lock which is formed by the notch 52, in the member 45 and the pin 51 of the lever 10 will be broken, permitting the member 45, through the pull of the spring 48 to return the shift lock key lever 43 to its normal position, as shown in Figure 1, thereby releasing the latch 27 from the stop 7, allowing the segment to return to its upper position.

The shift keys 10, one on each side of the machine, are mounted on the rock shaft 11,

and releasing pressure applied to either key will release the parts from their locked position shown in Figure 2.

The spring 41 functions to return and retain the shift key lever 10 in its normal position; the spring tension being just sufficient to balance the parts and hold the lever securely up against the usual stop. No other spring is provided for this purpose, because it is always very desirable to have the initial touch of keys of this character as light as possible, and it is also desirable to add as little increasing load to the key during its depression as possible. Therefore it will be seen that once the key is depressed sufficiently to bring the rear end of the link slot against the pin 30, the extension of the spring 41 ceases and thereafter adds no load to the key finger piece, the spring 35 acting to return the segment and lift the key.

It may be noted that in the shifting movement of the segment, no part of the type action is moved except the link M which connects the intermediate member L with the heel of the type bar. When the parts are in the Figure 1 position, this link inclines rearwardly and upwardly to a slight extent. When the parts are shifted, the front end of this link does not change its position, but in the shifted position it extends rearwardly and downwardly to a slight extent so that the action is precisely the same in both positions of the type segment.

It is obvious that various details may be modified and that parts of the invention will be used alone or in connection with constructions of a different character and, therefore, the invention is to be regarded as limited only by the scope of the appended claims.

I claim as my invention:

1. In a typewriting machine, a main frame, a type segment shiftable to upper and lower positions, a stop thereon, spaced upper and lower stops on the frame cooperating with the segment stop to limit the movement of the segment, latches alternately engaging opposite faces of the segment stop to lock the segment in upper and lower positions respectively, and key controlled means for moving the latches out of and into engagement with the opposite faces of the segment stop to respectively unlock and lock the segment in upper and lower positions and for shifting the segment when both latches are disengaged from the segment stop.

2. In a typewriting machine, a main frame, a type segment shiftable to upper and lower positions, a stop thereon, spaced upper and lower stops on the frame cooperating with the segment stop to limit the movement of the segment, latches alternately engaging opposite faces of the segment stop to lock the segment in upper and lower positions respectively, and key controlled means for moving the latches out of and into engagement with the opposite faces of the segment stop to respectively unlock and lock the segment in upper and lower positions and for shifting the segment when both latches are disengaged from the segment stop, said key controlled means including a loose connection for permitting disengagement of one of the latches from the segment stop prior to the segment beginning its shifting movement.

3. In a typewriting machine, a main frame, a shiftable type segment movable to upper and lower positions, a stop thereon, cooperating stops on the frame to limit the movement of the segment, a latch engaging the segment stop to lock the segment in upper position, a rock shaft journaled on the frame, an arm fixed to the shaft, a bell-crank lever fixed to the shaft, a link connecting the segment to one arm of the bell-crank lever, a spring connected to the other arm of the bell-crank lever and to the frame for returning the segment from lower to upper position, a shift key lever, and connections between the shift key lever and the latch and between said lever and the arm on the rock shaft including a loose connection for first disengaging the latch from the segment stop and for subsequently moving the segment to lower position during the depression of the shift key lever.

4. In a typewriting machine, a main frame, a shiftable type segment movable to upper and lower positions, a stop thereon, cooperating stops on the frame to limit the movement of the segment, a latch engaging the segment stop to lock the latter in upper position, a rock shaft journaled on the frame, an arm fixed to the shaft, a bell-crank lever fixed to the shaft, a link connecting the segment to one arm of the bell-crank lever, a spring connected to the other arm of the bell-crank lever and to the frame for returning the segment from lower to upper position, a shift key lever, and connections between the shift key lever and the latch and between said lever and the arm on the rock shaft including a loose connection for first disengaging the latch from the segment stop and for subsequently moving the segment to lower position during the depression of the shift key lever, the connection between the key lever and the arm including intermediate links connected together for lengthwise adjustment.

5. In a typewriting machine, a main frame, a shiftable type segment movable to upper and lower positions, a stop thereon, cooperating stops on the frame to limit the movement of the segment, a latch engaging the segment stop to lock the latter in upper

position, a rock shaft journaled on the frame, an arm fixed to the shaft, a bell-crank lever fixed to the shaft, a link connecting the segment to one arm of the bell-crank lever, a spring connected to the other arm of the bell-crank lever and to the frame for returning the segment from lower to upper position, a shift key lever, connections between the shift key lever and the latch and between said lever and the arm on the rock shaft including a loose connection for first disengaging the latch from the segment stop and for subsequently moving the segment to lower position during the depression of the shift key lever, a second latch adapted to engage the segment stop to lock the segment in lower position, a shift lock key adapted to depress the shift key lever, and a connection between the second latch and the shift lock key whereby upon depression of the latter the first mentioned latch will be released, the segment will be moved to lower position and the second latch will be engaged with the segment stop to lock the segment in lower position.

6. In a typewriting machine, a main frame, a shiftable type segment movable to upper and lower positions, a stop thereon, cooperating stops on the frame to limit the movement of the segment, a latch engaging the segment stop to lock the segment in upper position, a rock shaft journaled on the frame, an arm fixed to the shaft, a bell-crank lever fixed to the shaft, a link connecting the segment to one arm of the bell-crank lever, a spring connected to the other arm of the bell-crank lever and to the frame for returning the segment from lower to upper position, a shift key lever having a rock arm, a bell-crank lever fulcrumed on the rock arm of the shift key lever for limited movements relative thereto, a link connecting one arm of the last mentioned bell-crank lever with the latch, a spring interposed between the other arm of the last mentioned bell-crank lever and the arm on the shift key lever, a link connection between said last mentioned bell-crank lever and the arm on the rock shaft, a second latch adapted to engage the segment stop to lock the segment in lower position, a shift lock key adapted to depress the shift key lever, a link connecting the shift lock lever and the second latch whereby upon depression of the latter the first mentioned latch will be released, the segment will be moved to lower position and the second latch will be engaged with the segment stop to lock the segment in lower position.

7. In a typewriting machine, a main frame, a shiftable type segment movable to upper and lower positions, a stop thereon, cooperating stops on the frame to limit the movement of the segment, a latch engaging the segment stop to lock the segment in upper position, a rock shaft journaled on the frame, an arm fixed to the shaft, a bell-crank lever fixed to the shaft, a link connecting the segment to one arm of the bell-crank lever, a spring connected to the other arm of the bell-crank lever and to the frame for returning the segment from lower to upper position, a shift key lever having a rock arm, a bell-crank lever fulcrumed on the rock arm of the shift key lever for limited movements relative thereto, a link connecting one arm of the last mentioned bell-crank lever with the latch, a spring interposed between the other arm of the last mentioned bell-crank lever and the arm on the shift key lever, a link connection between said last mentioned bell-crank lever and the arm on the rock shaft, including a loose connection for first disengaging the latch from the segment stop and for subsequently moving the segment to lower position during the depression of the shift key lever, a second latch adapted to engage the segment stop to lock the segment in lower position, a shift lock key adapted to depress the shift key lever, a link connecting the shift lock lever and the second latch whereby upon depression of the latter the first mentioned latch will be released, the segment will be moved to lower position and the second latch will be engaged with the segment stop to lock the segment in lower position.

8. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, latches alternately engaging opposite faces of the shiftable element stop to lock the element in upper and lower positions respectively, and key controlled means for moving the latches out of and into engagement with the opposite faces of the shiftable element stop to respectively unlock and lock the shiftable element in upper and lower positions and for shifting the element when both latches are disengaged from the element stop.

9. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, latches alternately engaging opposite faces of the shiftable element stop to lock the element in upper and lower positions respectively, and key controlled means for moving the latches out of and into engagement with the opposite faces of the shiftable element stop to respectively unlock and lock the shiftable element in

upper and lower positions and for shifting the element when both latches are disengaged from the element stop, said key controlled means including a loose connection for permitting disengagement of one of the latches from the shiftable element stop prior to the element beginning its shift movement.

10. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in one of its case positions, a latch for engaging the shiftable element stop to lock the element in said case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently moving said element to its other case position against the tension of said spring, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its moved position.

11. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in one of its case positions, a latch for engaging the shifting element stop to lock the element in said case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently moving said element to its other case position against the tension of said spring, said key controlled means including a shift key lever and a train of operative connections between the lever and the shiftable element including a loose connection for permitting disengagement of the latch from the stop prior to the element being moved, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its moved position.

12. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in one of its case positions, a latch for engaging the shiftable element stop to lock the element in said case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently moving said element to its other case position against the tension of said spring, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its moved position, said cooperating means between the shift lock key lever and the key controlled means including means for releasing the key controlled means upon further depression of the shift key lever.

13. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in one of its case positions, a latch for engaging the shifting element stop to lock the element in said case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently moving said element to its other case position against the tension of said spring, said key controlled means including a shift key lever and a train of operative connections between the lever and the shiftable element including a loose connection for permitting disengagement of the latch from the stop prior to the element being moved, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its moved position, said cooperating means between the shift lock key lever and the key controlled means including means for releasing the key controlled means upon further depression of the shift key lever.

14. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, latches alternately engaging opposite faces of the shiftable element stop to lock the element in upper and lower positions respectively, key controlled means for moving the latches out of and into engagement with the opposite faces of the shiftable element stop to respectively unlock and lock the shiftable element in upper and lower positions and for shifting the element when both latches are disengaged from the element stop, and a shift lock key lever cooperating with the key con-

trolled means for locking the shiftable element in one of its shifted positions.

15. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in upper case position, a latch for engaging the shiftable element stop to lock the element in upper case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently lowering said element to its other case position against the tension of said spring, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its lower case position.

16. In a typewriting machine, a main frame, a platen element, a type segment element, one of said elements being shiftable to upper and lower case positions, a stop on the shiftable element, spaced upper and lower stops on the frame cooperating with the stop on the shiftable element to limit the movement of the shiftable element, a spring for yieldably retaining the shiftable element in upper case position, a latch for engaging the shiftable element stop to lock the element in upper case position, key controlled means for releasing said latch from engagement with the stop on the shiftable element and for subsequently lowering said element to its other case position against the tension of said spring, and a shift lock key lever cooperating with the key controlled means for locking said means in its effective position with the shiftable element in its lower case position, said cooperating means between the shift lock key lever and the key controlled means including means for releasing the key controlled means upon further depression of the shift key lever.

In testimony whereof, I have hereunto subscribed my name.

GEORGE F. HANDLEY.