G. W. CAMPBELL.

TYPEWRITING MACHINE.

APPLICATION FILED JAN. 11, 1921.

1,433,935. Patented Oct. 31, 1922.

2 SHEETS—SHEET 1.

Fig. 1

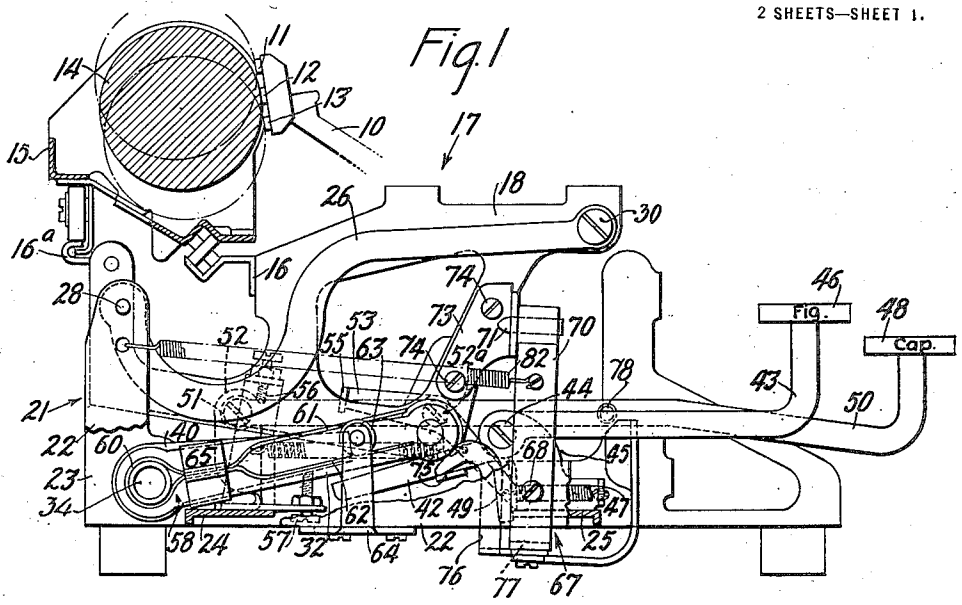


Fig. 2

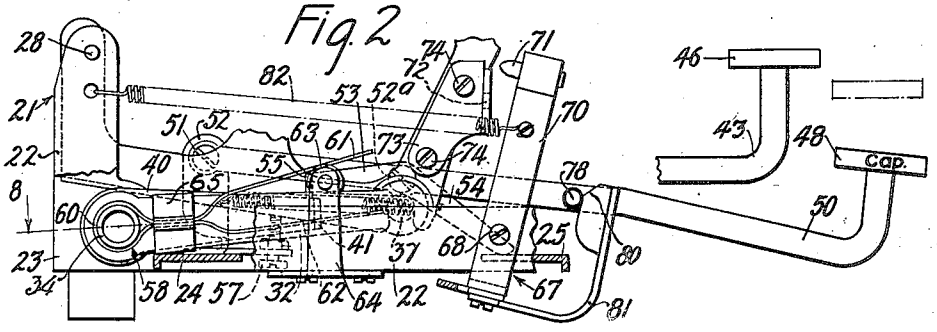


Fig. 3

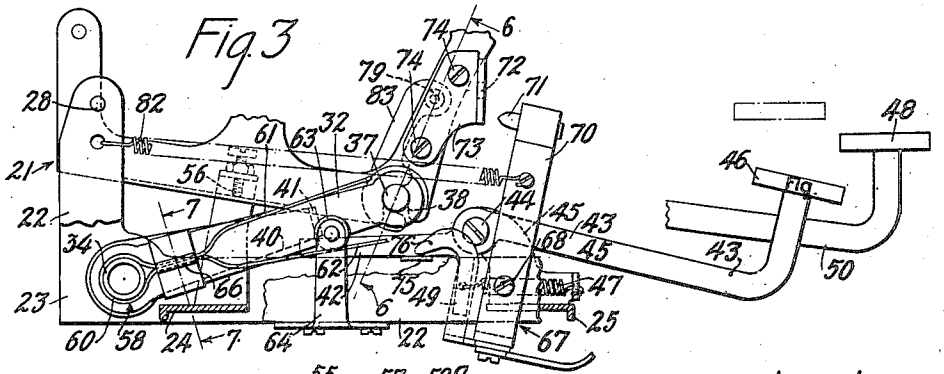
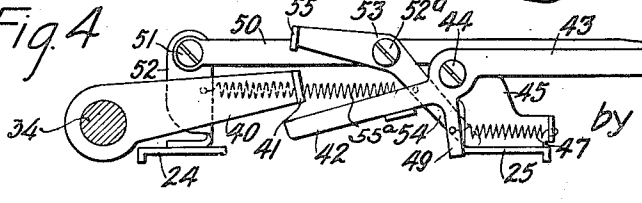


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 6.

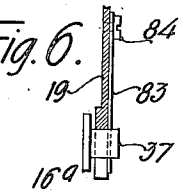


Fig. 7.

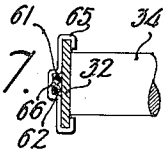


Fig. 5.

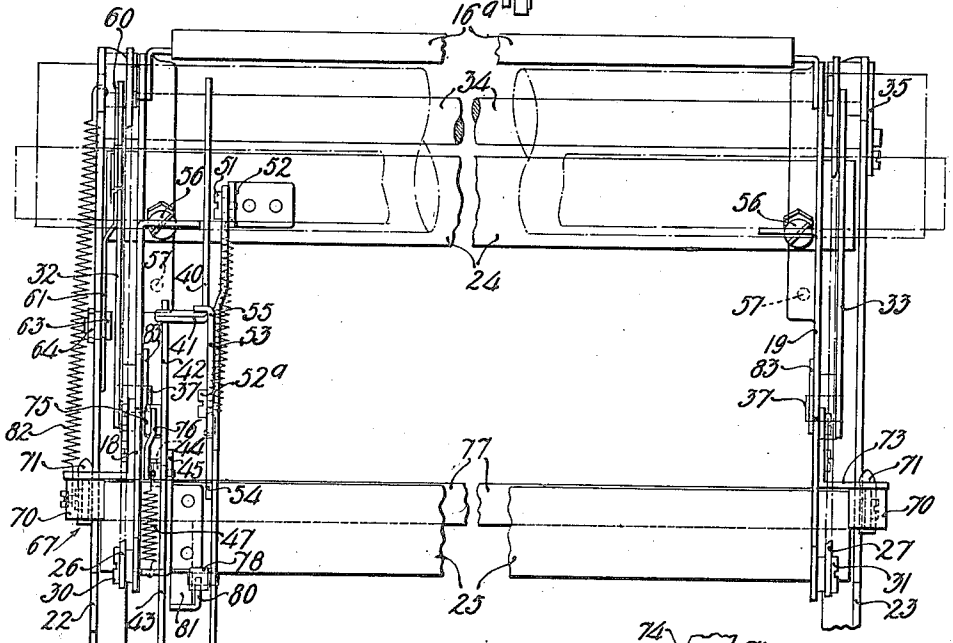


Fig. 9.

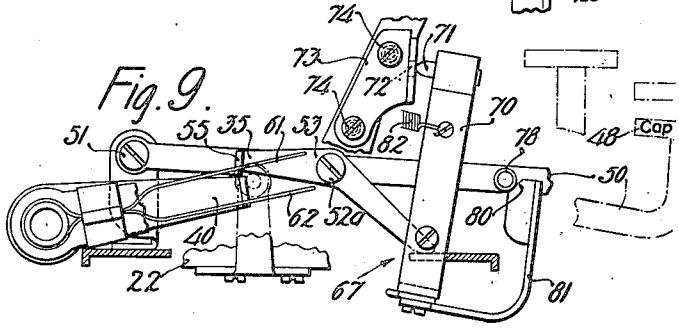


Fig. 8.

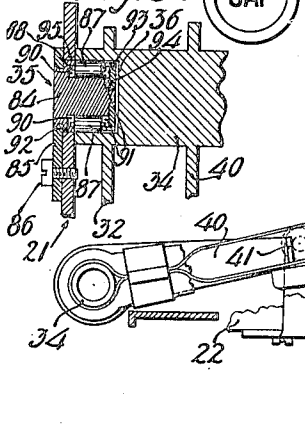


Fig. 10.

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Patented Oct. 31, 1922. 1,433,935

UNITED STATES PATENT OFFICE.

GEORGE W. CAMPBELL, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING MACHINE.

Application filed January 11, 1921. Serial No. 436,431.

To all whom it may concern:

Be it known that I, GEORGE W. CAMPBELL, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to case-shifting mechanism for typewriting machines, in which the type-bars are provided with three types. In the form of the invention herein disclosed, the platen normally occupies a midway position to receive impressions from the middle types, and is shiftable up or down to receive impressions from the other types.

A feature of the invention comprises a novel form of locking or holding means, which may co-operate with the shift-frame, to retain the platen in its normal position; the holding means being operable by the shift-keys to release the shift-frame.

Another feature resides in spring mechanism to restore the shift-frame to, and hold it in, normal position.

Still another feature relates to means to maintain a permanent connection between the shift-frame and the guide-arm therefor.

A further feature of the invention resides in the bearings for a rock-shaft of the case-shifting mechanism.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is an elevation of the machine, as seen from the left-hand side of the machine, parts being broken away to show the interior structure.

Figure 2 is a fragmentary side elevation, showing the shift-frame moved to its lower position by the depression of one of the shift-keys.

Figure 3 is a view similar to Figure 2, and shows the shift-frame moved to its upper position by the other key.

Figure 4 is a view of the shift-key lever actions.

Figure 5 is a top plan view of the machine, showing the case-shifting mechanism; the carriage being removed.

Figure 6 is a detail sectional view, taken on the line 6—6 of Figure 3, and shows the latch for maintaining the connection between the shift-frame and one of the guide-arms.

Figure 7 is a detail sectional view, taken on the line 7—7 of Figure 3, and shows the manner of fastening the spring mechanism for the shift-frame.

Figure 8 is a detail sectional view, taken on the line 8 of Figure 2, and shows one of the end bearings for the rock-shaft of the case-shifting mechanism.

Figure 9 is a diagrammatic side view, showing the holding means operated by one of the shift-keys to release the shift-frame before the latter is moved to its lower position.

Figure 10 is a similar view, and shows the locking means operated by the other shift-key to release the shift-frame before it is raised to its upper position.

The invention is herein shown as applied to an Underwood portable typewriter, disclosed in the patent to Burridge, No. 1,297,085, dated March 11, 1919, and in the patent to Dobson, No. 1,335,956, dated April 6, 1920. Each type-bar 10 is provided with three types 11, 12 and 13 to print against the front of a platen 14 when the latter is in upper, middle, and lower position, respectively. The type-bars 10 may be operated by keys (not shown.) The platen is supported in a carriage 15 which moves back and forth on rails 16 and 16ª, forming part of a shift-frame 17, having end plates 18 and 19 (Figures 1 and 5). The shift-frame 17 is mounted for up-and-down movement in a main frame 21, the latter comprising side plates 22 and 23 joined to each other by cross-bars 24 and 25. The shift-frame 17 is guided relatively to the main frame 21 by links 26 and 27 pivotally mounted on the side plates 22 and 23, respectively, at 28. The links extend forward and are connected to the end plates 18 and 19 of the shift-frame by screws 30 and 31. To assist in guiding the shift-frame in its movements, two arms 32 and 33 are provided, one at each side of the machine. These arms extend forwardly from a rock-shaft 34 pivotally supported in the main frame by means of bearing units 35 hereinafter described; said bearing units engaging in holes 36 in the ends of the rock-shaft 34. The arms 32 and 33 are rigidly

secured to the rock-shaft 34 and have studs 37 at their forward ends projecting into slots 38 in the end plates of the shift-frame.

To actuate the shift-frame 17, there may be connected therewith an operating arm 40 permanently secured to and extending forwardly from the rock-shaft 34. The forward end of the operating arm 40 is provided with a lateral projection or lip 41 (Figures 3, 5 and 10), which may be engaged, when it is desired to shift the platen from middle to upper position, by a rearwardly-extending arm 42 of a shift-key lever 43 pivoted at 44 on a bracket 45 secured to the cross-bar 25 of the main frame 21. The lever 43 may be depressed by a key 46 thereon, and is provided with a return spring 47 connected to an extension 49 of the lever, said extension engaging with the cross-bar 25 when the shift-key is in its normal position (Figures 1 and 4).

To shift the platen from middle to lower position, there is provided a shift-key 48, mounted on the forward end of a shift-lever 50, pivoted at 51 on a bracket 52 secured to the crossbar 24 (Figures 1, 4 and 5). The key-lever 50 has pivotally mounted thereon at 52^a an intermediate lever 53, one end 54 thereof engaging the cross-bar 25, the latter serving as an abutment or fulcrum-plate for the intermediate lever. When the key-lever 50 is depressed, the rear end 55 of the intermediate lever 53 moves downwardly to actuate the operating arm 40 and rock the shaft 34 in a clockwise direction, thus lowering the forward ends of the guide-arms 32 and 33, and, consequently, the shift-frame 17. The key-lever 50 and intermediate lever 53 are provided with a return-spring 55^a connected to the bracket 52 and to the forward arm of the intermediate lever 53. Stops 56 and 57 are provided to limit the movements of the shift-frame in both directions. It will be seen that while the operating arm 40 might be operated directly by the key-lever 50, the movement of the arm 40 would be insufficient. The intermediate lever 53, however, serves to multiply the movement due to the key-lever 50 and thereby to actuate the arm 40 to the desired extent.

Spring mechanism 58 is provided to restore the shift-frame with the platen from its extreme positions to normal. The spring mechanism may comprise a wire having a loop 60 to embrace the rock-shaft 34. Two arms or elements 61 and 62 extend from the loop 60 and engage an abutment 63 on a bracket 64 secured to the side plate 22 of the main frame. The spring mechanism is located adjacent the guide-arm 32, and is held in place thereon by a strap 65 secured to said arm, Figures 3 and 7; said strap having a groove 66 to embrace the spring arms 61 and 62. By an inspection of Figure 2, it will be seen that the spring arm 61 is effective to restore the shift-frame. In Figure 3 the spring arm 62 is effective.

The platen 14 may be held in its middle position by locking mechanism co-operating with the shift-frame 17. Said locking mechanism may comprise a bail 67 pivoted on the main frame 21 by screws 68; said bail having two arms 70, with projections 71, the latter engaging in openings 72 of brackets 73 on the shift-frame. The brackets 73 are held in place on the shift-frame by screws 74, and are slightly adjustable (Figure 9), so as to facilitate the correct positioning of the platen in its middle position relatively to the types 12.

The locking bail 67 is operable by the shift-keys 46 and 48 during the initial parts of their downward movements, to release the shift-frame so that the platen may be shifted. To this end, the shift-key 46 which shifts the platen to upper position is provided with a lip 75 to engage an arm 76 secured to a cross-bar 77 of the bail 67, to swing the latter about its pivot 68 and withdraw the projections 71 from the holes 72, as seen in Figure 10. By an inspection of Figures 1 and 4, it will be seen that there is a lost motion between the arm 42 of the key-lever 43 and the operating arm 40, so that the locking bail may be moved to its ineffective position (Figure 10) before the key-lever engages the operating arm to actuate the shift-frame. While the latter is released, as in Figure 10, the spring mechanism comprising the arms 61 and 62 is effective to hold the shift-frame in its middle position. A further depression of the shift-key 46, however, moves the shift-frame upwardly, against the tension of the spring arm 62, to the position indicated in Figure 3.

To actuate the locking bail by the other key-lever, there may be provided on the key-lever 50 a follower 78 to engage a cam 80 on an arm 81 secured to the cross-bar 77 of the holding bail, to swing it to the position indicated in Figure 9. At this time lost motion between the intermediate lever 53 and the operating arm 40, Figures 1 and 4, will have been taken up. A further depression of the shift-key 48 is effective to move the shift-frame to its lower position, Figure 2, against the tension of the spring arm 61.

As hereinbefore stated, the spring mechanism is effective to restore the shift-frame to its middle position. To accurately locate the shift-frame in this position, after it is returned by either one of the spring arms 61 and 62, the projections 71 on the locking bail 67 may be in the form of tapered studs that they may readily find their way into the holes 72 in the shift-frame when the locking bail is restored to normal position by means of a return spring 82, one end of which is

connected with the locking bail, the other end being anchored on the main frame 21.

It will be understood that any suitable form of locking device may be associated with the key-levers 43 and 50 to hold them, if so desired, in their operated positions; various forms of locking devices being shown in the patents to Burridge and Dobson, above mentioned.

For convenience in assembling the shift-frame 17 on the main frame 21, the slots 38 in the shift-frame are vertically disposed, so that it may be set in from the top of the main frame on the studs 37 of the guide-arms 32 and 33. The guide-links 26 and 27 may then be connected to the shift-frame by the screws 30 and 31. It is desirable to secure the studs 37 in the slots 38 to maintain the connection between the shift-frame 17 and the operating arm 40 during case-shifting operations. For this purpose, there is provided on each of the end plates 18 and 19 a latch 83. The latches (Figures 3 and 5) may be swung about their pivots 79 to embrace the studs 37 to keep them in the slots 38. The latches may be frictionally held in position against the end plates. They may be swung rearwardly about their pivots and clear of the studs 37 in assembling or disassembling.

To reduce friction to a minimum and to facilitate the assembling of the rock-shaft 34 of the case-shift mechanism, said rock-shaft may be mounted at each end on a roller bearing unit 35, as hereinbefore stated. Each unit 35 (Figure 8) may comprise a stud 84 projecting from a plate 85 secured to the main frame 21 by a screw 86. Rollers 87 are contained within the hole 36 and bear against the stud 84. The rollers 87 may be reduced at their ends 88 to project into grooves 90 and 91. The groove 90 may be formed in flange 92 of the stud 84. The groove 91 at the other ends of the rollers may be formed by the stud and a flange 93 of a disk 94, which may be secured to the stud in any convenient manner. Thus, there is provided the roller bearing comprising the arm or plate 85, the stud 84 and the rollers 87 which may be assembled as a single unit 35. The rollers of each unit may then be readily inserted through holes 95 in the main frame 21, and into the holes 36 at the ends of the rock-shaft 34 in assembling the latter on the main frame 21.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, in combination, a case-shift-frame, spring means for yieldably holding said case-shift-frame in its normal position, means to lock said frame in its normal position including a shiftable frame having a tapered pin to enter an opening in the case-shift-frame, means for shifting the case-shift-frame from its normal position, the shifting means including a shaft, operating connections between said shaft and said case-shift-frame, an arm projecting from said shaft, a shift-key-lever, an intermediate lever pivoted on said shift-key-lever, and an abutment to engage one end of said intermediate lever so that depression of the key-lever will actuate said intermediate lever to engage said arm to shift said case-shift-frame, and cam means on said key-lever and shiftable frame whereby depression of the former will shift the latter to ineffective position.

2. In a typewriting machine, in combination, a case-shift-frame, spring means for yieldably holding said case-shift-frame in its normal position, means for shifting said case-shift-frame comprising an actuating arm connected with said shift-frame, two shift-key-levers, one of said key-levers engaging directly with said actuating arm to operate the latter to move the shift-frame in one direction from its normal position, an intermediate lever pivoted on the other key-lever, an abutment for the intermediate lever, the latter engaging the actuating arm, when the associated key-lever is actuated, to move the shift-frame from its normal position in a direction opposite to that effected by the lever engaging directly with the actuating arm, and a spring to resist the turning of said intermediate lever relatively to the associated key-lever and to return the latter to its normal position when released.

3. In a typewriting machine, in combination, a case-shift-frame, spring means for yieldably holding said case-shift-frame in its normal position, shift-frame actuating means comprising an actuating arm connected with the shift-frame, a key-lever, an intermediate lever pivoted thereon, an abutment for the intermediate lever, the latter engaging the actuating arm to move said frame in one direction from its normal position, a spring to resist the movement of the intermediate lever relatively to the key-lever and to return the latter to normal position, a locking device to retain said frame in normal position to relieve the return-spring of the weight of said frame, means operable by the key-lever to actuate the locking device to release said shift-frame prior to a shifting operation, and a return-spring for the locking device.

4. In case-shifting mechanism, the combination of a shift-frame, an actuating arm connected with said shift-frame, two shift key-levers, one of said levers engaging directly with said actuating arm to operate the latter to move the shift-frame upwardly from its normal position, an intermediate

lever pivoted on the other key-lever, an abutment for the intermediate lever, the latter engaging the actuating arm when the associated key-lever is actuated, to move the shift-frame downwardly from its normal position, stops to limit the movements of said frame in both directions, a spring to return said frame to normal, and a locking device controlled by said key-levers to hold said shift-frame in normal position.

5. In case-shifting mechanism, the combination of a shift-frame, an actuating arm connected with said shift-frame, a key-lever, an intermediate lever pivoted thereon, an abutment for the intermediate lever, the latter engaging the actuating arm to move said frame downwardly from its normal position, a stop to limit the downward movement of said frame, a return spring for said frame, a locking device to retain said frame in normal position and to relieve the return spring of the weight of said frame, means operable by the key-lever to actuate the locking device to release said frame prior to a shifting operation, and a return spring for the locking device.

6. In case-shifting mechanism, the combination of a shift-frame, an actuating arm connected with said frame, a key-lever, an intermediate lever pivoted thereon, an abutment for the intermediate lever, the latter engaging the actuating arm to move said frame downwardly from its normal position, a stop to limit the downward movement of said frame, and a return spring for said frame.

7. In case-shifting mechanism, the combination of a shift-frame having holes, key-levers to actuate said frame in two directions from a middle position, stops to limit the movements of said frame in both directions, a pivoted bail, tapered studs on said bail to enter the holes in said frame, arms on said bail to be engaged by said levers to operate said bail to release said frame prior to the movement of the latter, and a spring to hold said frame in its middle position, the frame being movable against the tension of said spring, said tapered studs being effective to accurately locate said frame when the latter is restored to its middle position.

8. In a typewriting machine, in combination, a case-shift-frame, spring means for yieldably holding said case-shift-frame in its normal position, case-shift-frame actuating means including an actuating arm connected with said frame, a key-lever, an intermediate lever pivoted thereon, an abutment to engage said intermediate lever to turn the same relatively to the key-lever when the latter is depressed, the intermediate lever engaging the actuating arm to move the frame from its normal position, a stop to limit the movement of said frame by said key-lever, a return-spring for said frame, and a spring to resist the turning of said intermediate lever relatively to the key-lever and to return the intermediate lever and the key-lever to their normal positions when the key-lever is released.

9. In case-shifting mechanism, the combination of a shift-frame, a rock-shaft, a key-operated arm on said rock-shaft to actuate said frame in two directions from a middle or normal position, spring mechanism to return the frame to its normal position, said spring mechanism including a spring having a loop to embrace the rock-shaft and two arms extending from said loop, said arms having contacting portions close to the loop and then spread apart to form parallel portions, a holding device to embrace the contacting portions of said arms and hold them close together, said holding device being fastened to said key-operated arm to hold the spring relatively thereto, and a fixed abutment extending between the spring arms and normally embraced thereby.

10. In a typewriting machine, in combination, a case-shift-frame comprising two side members, means including a spring to maintain the case-shift-frame in its middle or normal position, locking means for said case-shift-frame comprising two arms pivoted at their lower ends and provided at their upper ends with tapered projections to enter openings in the front ends of the respective side members, a bar connecting the lower ends of said arms, an arm extending upwardly from said bar at the rear thereof and curved to the rear at its upper end to form a hook, an arm extending forwardly from said bar and then upwardly, a cam on the rear face of the upwardly-extending portion of the last-mentioned arm, shifting means for the case-shift-frame including two key-levers extending from the front of the machine toward the rear thereof, one pivoted intermediate of its ends and having provisions on its rear arm to engage said hook and thereby release said case-shift-frame, and the other key-lever pivoted at its rear end and provided with a follower to engage said cam and release said case-shift-frame, and means whereby depression of one of said key-levers, after effecting release of the case-shift-frame, will cause the latter to be shifted in one direction, and depression of the other key-lever, after effecting release of the case-shift-frame, will cause a shifting of the case-shift-frame in the opposite direction.

11. In a typewriting machine, in combination, a platen, a platen carriage, a vertically-movable shift-frame on which said platen carriage is mounted to travel transversely of the machine and with which the platen carriage is removable from the machine, said shift-frame comprising side members each having a vertical open slot

at its lower edge, a transverse shaft, arms projecting substantially horizontally from said shaft adjacent said side members, studs projecting laterally from said arms in such positions that, when the shift-frame is inserted into the machine from above, the studs will be received in said slots, and latches to hold said studs in said slots.

12. The combination with a main frame, of case-shifting mechanism comprising a rock-shaft and roller bearings for said rock-shaft, each roller bearing comprising an arm, a stud on said arm, rollers to bear against said stud, reduced ends on said rollers, and flanges on said stud to engage the reduced ends to hold the rollers on the stud, each roller bearing being detachably mounted on the main frame.

13. The combination with a main frame, of case-shifting mechanism comprising a rock-shaft and roller bearings for said rock-shaft, each roller bearing comprising an arm, a stud on said arm, rollers to bear against said stud, reduced ends on said rollers, a flange having a groove therein on said stud, and a disk secured to said stud, said disk having a flange to form a groove with said stud, the reduced ends of the rollers engaging in said grooves to hold the rollers on the stud.

14. In a typewriting machine, in combination, a platen, a platen carriage, a vertically-movable shift-frame on which said platen carriage is mounted to travel transversely of the machine and with which the platen carriage is removable from the machine, said shift-frame comprising side members each having a vertical open slot at its lower edge and a flange at its lower edge, a transverse shaft, arms projecting substantially horizontally from said shaft adjacent said side members, studs projecting laterally from said arms in such positions that, when the shift-frame is inserted into the machine from above, the studs will be received in said slots, latches to hold said studs in said slots, and adjustable stops above and below each flange to limit the upward and downward movement of the shift-frame.

15. In a typewriting machine, in combination, a case-shift-frame, means for shifting said frame comprising a forwardly-extending actuating arm, a shift-key-lever pivoted at the rear of the forward end of said arm, an intermediate lever pivoted on said shift-key-lever, the rear end of the rearwardly-extending arm of said intermediate lever overlying the front end of said actuating arm, and the forward arm of said intermediate lever extending forwardly and downwardly, an abutment on which said forward arm rests, a spring to hold the forward arm against said abutment and thereby hold the rear end of the intermediate lever and also the key-lever in raised position, a second shift-key-lever pivoted at the front of the forward end of said actuating arm and having the rear end of the rearwardly-extending arm underlying the front end of said actuating arm, said second lever having a downwardly-extending finger to engage said abutment, and a spring normally holding said finger against said abutment.

GEORGE W. CAMPBELL.

Witnesses:
EDITH T. SEARLES,
LOTTA T. BAYER.