Sept. 26, 1961 R. D. DODGE ET AL 3,001,630

CASE SHIFT MECHANISM FOR TYPEWRITERS

Filed Aug. 12, 1959 3 Sheets-Sheet 1

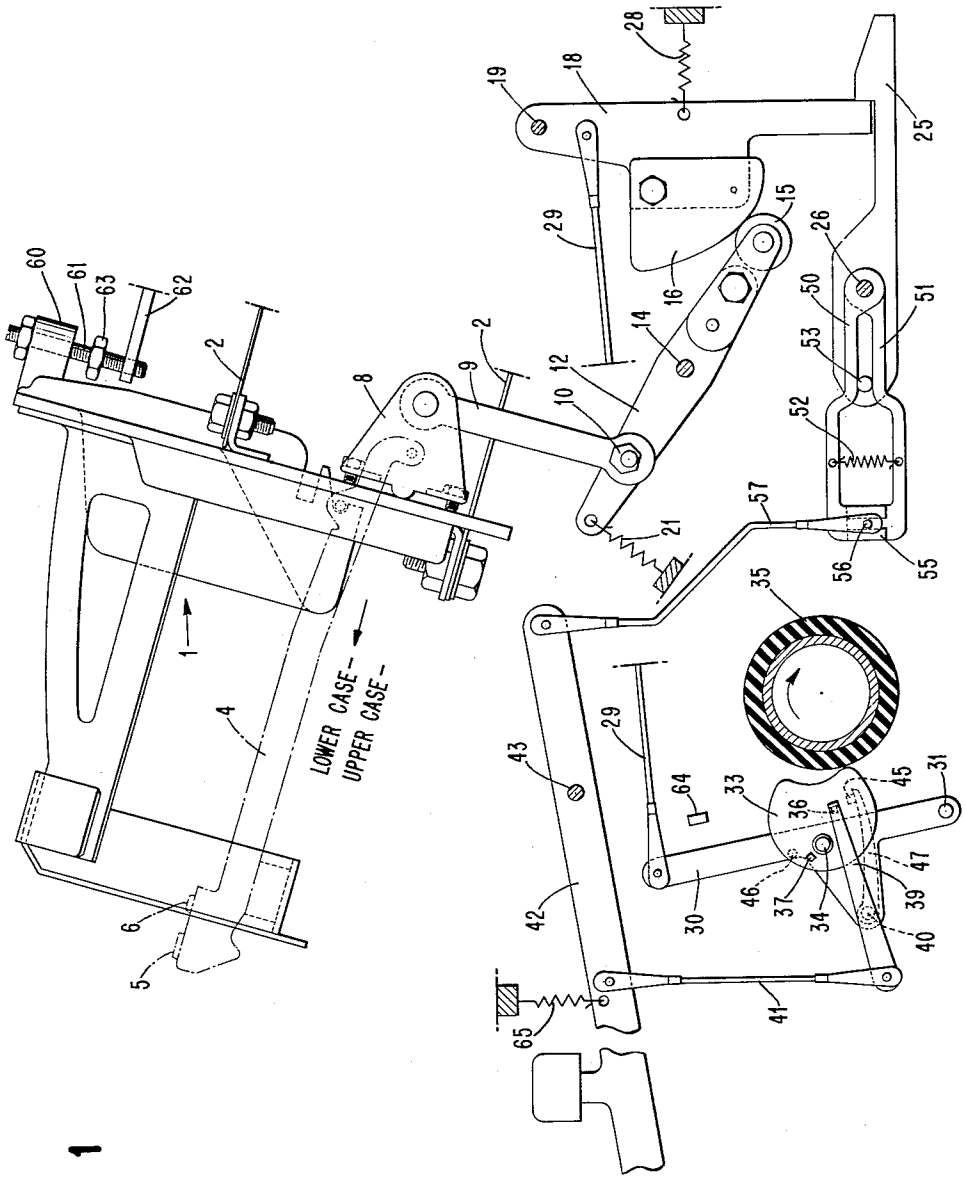


FIG. 1

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CASE SHIFT MECHANISM FOR TYPEWRITERS

Filed Aug. 12, 1959 3 Sheets-Sheet 2

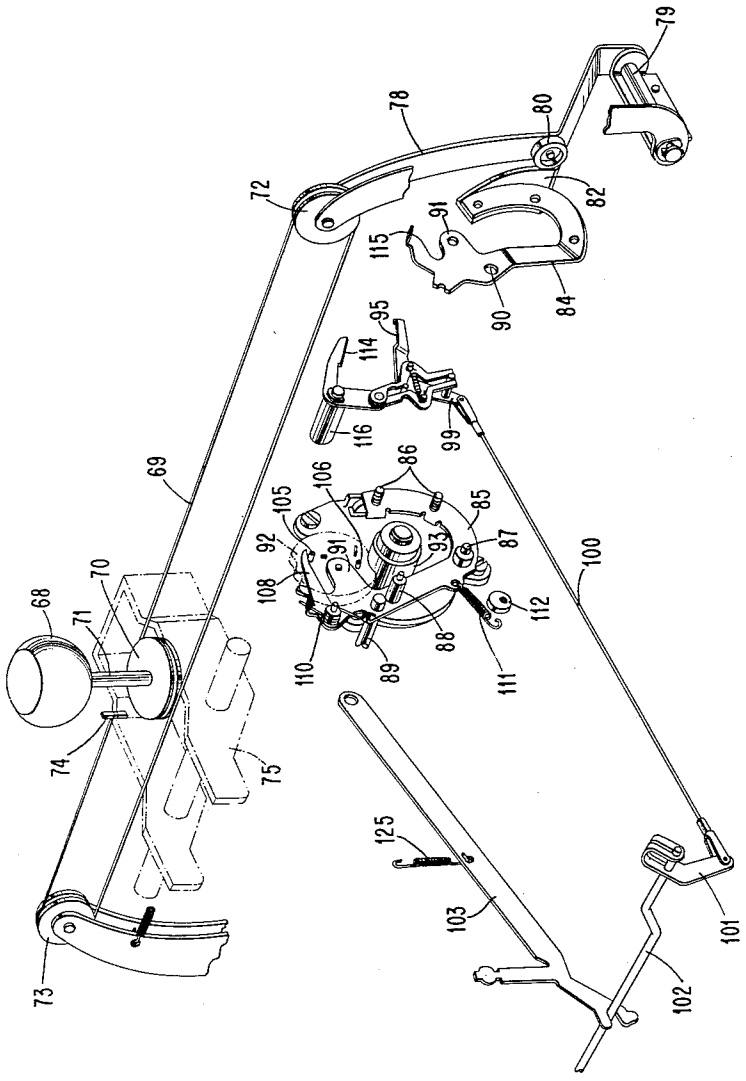


FIG. 2

Sept. 26, 1961 R. D. DODGE ET AL 3,001,630

CASE SHIFT MECHANISM FOR TYPEWRITERS

Filed Aug. 12, 1959 3 Sheets-Sheet 3

FIG. 3

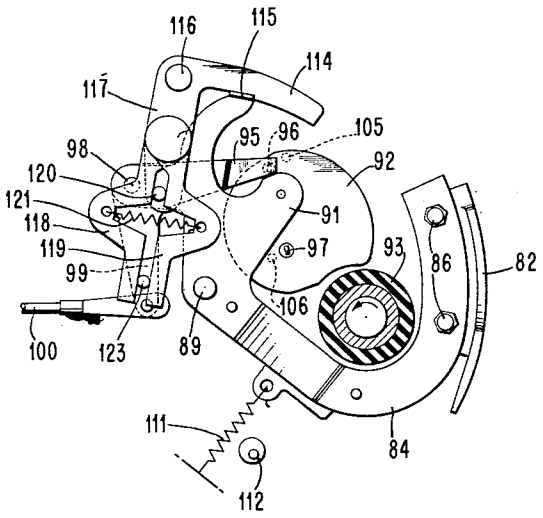
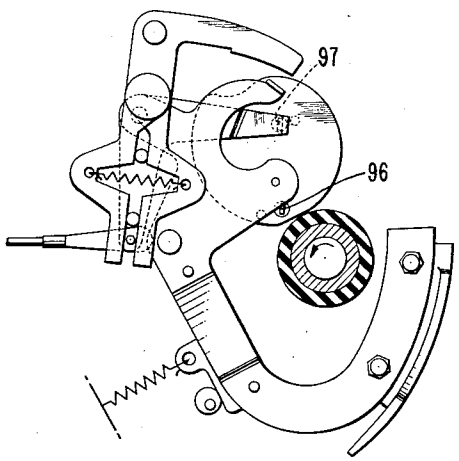


FIG. 4



United States Patent Office

3,001,630

Patented Sept. 26, 1961

3,001,630

CASE SHIFT MECHANISM FOR TYPEWRITERS

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Filed Aug. 12, 1959, Ser. No. 833,337

6 Claims. (Cl. 197—74)

This invention relates to typewriting machines, and more particularly to case shift mechanisms for such machines.

In shifting from lower case to upper case printing or from upper to lower case printing, it is necessary, in the conventional typewriter, to move a type basket including type bars from one position to another. The mass of the moving parts is considerable and may produce substantial noise and shock if the motion is not positively controlled at all times. With a single head typewriter such as that shown by the L. F. Palmer et al. Patent 2,879,876, the type head is rotated rapidly between different positions during case shift. Any shock produced as a result of such motion may cause parts to get out of adjustment and operate inaccurately.

By providing a power operated shift mechanism which either moves the conventional type basket or rotates a type head positively from one position to another, a smooth operation without shock or noise may be obtained. The mechanism may be latched in its normal lower case operating position to avoid any partial shifting due to vibration. Movement in the opposite direction may be effected by springs under the control of power operated means to give a smooth operation.

An object of this invention is to provide an improved case shifting mechanism for a typewriter.

Another object is to provide an improved mechanism which operates to shift type between lower and upper case printing positions smoothly and without shock.

Yet another object is to provide a mechanism which is power operated to shift type positively in one direction between lower and upper case printing positions, and is power operated to control the shift in the opposite direction under the action of springs.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

FIG. 1 is a side elevational view of an improved mechanism for shifting the type basket of a conventional typewriter between lower and upper case positions.

FIG. 2 is a perspective view of a mechanism for positioning a single type head to effect printing from either lower or upper case characters.

FIG. 3 is an enlarged side elevational view of the driving mechanism in FIG. 2 when in position for lower case typing.

FIG. 4 is a view similar to that of FIG. 3 but showing the mechanism in position for upper case printing.

Referring to the drawings, and more particularly to FIG. 1, it will be noted that there is shown a type basket, generally designated 1, which is supported by leaf springs 2 for movement in a direction normal to the springs.

The basket is like that used in conventional typewriters and is shown and described more in detail by Patent No. 2,517,989 to R. D. Dodge. Pivotally mounted within the basket are type bars 4, each having an upper case character 5 and a lower case character 6 adapted to be engaged selectively with a platen, not shown. The characters printed depend on which of two positions the basket may be in when typing takes place. As shown in FIG. 1, the basket is in its lower case printing position and is held there by means which will be described shortly.

Fixed to the basket is a bracket 8 to which a link 9 is pivotally connected at one of its ends. The other end of the link is pivotally mounted on an eccentric 10 which, in turn, is pivotally connected to a lever 12 arranged to swing about a stationary pivot 14. The eccentric 10 may be rotated manually to make fine adjustments in the connections between the basket and the lever 12. At the right hand end of the lever is a roller 15 engaging a cam member 16 fixed to a lever 18 which is supported at one end by a stationary pivot 19. Connected to the left hand end of the lever 12 is a spring 21 which operates to hold the roller 15 in engagement with the cam member 16 and cause the type basket to move downwardly to its upper case printing position when the lever is permitted to rock in a counterclockwise direction.

As shown in FIG. 1, the type basket is in its lower case printing position and is held there by the lever 18 which is latched in place by a latch element 25 pivotally supported by a stationary pin 26. When the latch element is released from the lever, the latter is rocked in a counterclockwise direction by a spring 28 and by the action of spring 21 on lever 12. For controlling movement of the lever 18 under action of these springs and for moving the lever in a clockwise direction against the spring action, there is provided a link 29 connected at one end to the lever 18 and connected at its other end to a cam lever 30 pivotally supported at 31. Mounted upon the lever 30 is a cam 33 rotatably supported at 34 and engageable with a power roll 35 which is driven continuously in a clockwise direction. Projecting from one side of the cam 33 are two pins 36 and 37 engageable with a lug on a release lever 39 for limiting rotation of the cam. The release lever 39 is pivotally connected at 40 to a projecting portion of the cam lever 30, and the left hand end of the release lever is connected by a link 41 to a key lever 42 which is pivotally supported at 43. At the side of the cam 33 opposite the pins 36, 37 are two pins 45 and 46 which are engageable with a spring arm 47. When the cam is in a position with one of its pins 36, 37 engaging the lug on the release lever 39, the spring arm 47 engages one of the pins 45, 46 and tends to rotate the cam in a counterclockwise direction.

For operating the latch element 25 there is provided a pair of arms 50, 51 loosely mounted on the pivot pin 26 and held normally by a spring 52 against opposite sides of a pin 53 fixed to the latch element at its left end. The free ends of the arms 50, 51 have oppositely extending bifurcated portions 55 receiving a pin 56 carried by a link 57 pivotally connected to the right end of the key lever 42.

With the parts in positions shown in FIG. 1, a depression of the key lever 42 results in a rocking of the release lever 39 in a counterclockwise direction to move its lug

out of the path of the pin **36** on the cam **33**. The link **57** is lifted at the same time to swing the arm **50** upwardly and place a tension on the arm **51** which acts against the pin **53** to urge the latch element away from the end of the lever **18**. As soon as the cam **33** is released, the spring arm **47** rocks it into engagement with the power roll **35** to be driven by the latter in a counterclockwise direction. The shape of the cam is such as to effect first a slight movement of the control lever away from the latch element. If the latch has not already been released by the action of the arm **51** on the pin **53**, it will be swung to a released position as soon as the load of the control lever is removed. The contour of the cam **33** then permits the lever **18** to swing to the right under the action of springs **21** and **28**. As this operation takes place, the cam member **16** permits a swinging of the lever **12** under the action of the spring **21** for lowering the basket **1**. Formed on the basket is a boss **60** having an opening into which a screw **61** is threaded. The screw extends freely through an opening in a frame portion **62** of the typewriter, and mounted on the screw is a nut **63** engageable with the frame portion **62** to limit movement of the basket downwardly to its upper case printing position. Just as the nut **63** engages the frame portion **62** and stops downward movement of the basket, the cam lever **30** engages a stop or abutment **64** and is held against further motion in a clockwise direction.

The depression of the key lever **42** caused the release lever **39** to swing its lug out of the path of the pin **36** and into the path of the pin **37**. When the cam lever **30** engages the stop **64**, the pin **37** is just short of the lug on the release lever and the pin **46** engages the spring arm **47** so that the latter tends to rotate the cam in the same direction in which it is driven by the power roll. The lowest dwell on the cam **33** has not come opposite the power roll at this time and so the arm **47** drives the cam until the pin **37** engages the lug on the release lever. A slight clearance exists between the cam and the power roll at this time, and the basket is held in its upper case position as long as the key lever **42** is held depressed.

When the key lever is released, a spring **65** swings it upwardly to rock the release lever **39** for moving its lug out of the path of the pin **37** and into the path of the pin **36**. The spring arm **47** acting on the pin **46** causes the cam to turn into engagement with the power roll to be driven by the latter. A rising surface on the cam **33** now causes the lever **30** to be driven in a counterclockwise direction and pull with it the control lever **18**. The cam member **16** on the control lever acts to swing the lever **12** in a direction to lift the basket. Upward movement of the key lever causes the link **57** to return the latch element **25** to a position for engaging the end of the lever **18** when the basket is lifted to its lower case printing position. At the time the basket reaches this position, a high dwell on the cam **33** engages the power roll and the pin **36** is just short of the lug on the release lever **39**. The spring arm **47** operates on the pin **45** to drive the cam until the pin **36** engages the lug on lever **39** and the cam is in a position clear of the power roll as shown in FIG. 1.

FIGS. 2, 3, and 4 show another form of the same invention for positioning a single element type head **68** like that of the above mentioned Patent No. 2,879,876 for printing either upper or lower case characters. As described by this patent, the head has upper case characters formed on its surface at one side of a vertical bisecting plane, and lower case characters on its surface at the opposite side of the plane. A predetermined point in one or the other of the different character bearing surfaces is normally positioned adjacent a platen, not shown, and then the head is rotated and tilted different angular distances to present different characters to the platen for printing. As shown by FIG. 2, a tape **69** is connected at one end to a pulley **70** on a spindle **71** carrying the type head and extends around pulleys **72** and **73** to be connected at **74** to a carrier **75** on which the type head is mounted. The pulley **72** is mounted on a lever arm **78** pivotally supported by a pin **79**, and a roller **80** is carried by the arm for engagement with a cam member **82**. The roller is shown in FIG. 2 engaging a high point on the cam member **82** to position the head **68** for printing lower case characters. On moving the cam member to a position presenting a predetermined lower point on its surface to the roller **80**, the arm **78** swings counterclockwise and permits the pulley **70** to rotate 180 degrees under the action of a spring, not shown. From this position, the head may be rotated and tilted to present upper case characters for printing.

The cam member **82** is carried by a pair of frame members **84** and **85** which are generally of the same shape. Bolts **86** extend through the frame members and a flange on the cam member for holding the latter in place and for connecting the frame members to operate as a unit. Rivets **87** and **88** also connect the frame members together for operation as a unit. As shown in FIG. 2, a pivot pin **89** extends through an opening in the frame member **85** and is adapted to be received in an opening **90** in the frame member **84**, thereby supporting them for pivotal movement. Formed on each of the frame members is a projecting portion **91** between which a cam **92** is rotatably supported.

The frame members, as shown herein, are in the shape of the letter **C**, and a power roll **93** is supported within the center portion of the members and rotated continuously in a counterclockwise direction. The cam **92** is normally latched in a position free of the power roll but may be released so it is driven by the power roll to effect either a positive rocking of the frame members in a counterclockwise direction or a controlled rocking in the opposite direction. Latching of the cam is effected by a latch arm **95** having a lug which is engageable with one or the other of two pins **96** and **97** projecting from one side of the cam. As shown in FIG. 3, the frame members are in a position to engage the high dwell of the cam **82** with the roller **80** for positioning the type head **68** to print lower case characters. The latch arm **95** engages the pin **96** at this time to hold the cam free of the power roll. Extending from the frame members is a projecting portion carrying a pivot **98** on which the latch arm is supported. A crank arm **99** is formed integral with the latch arm and is connected by a link **100** to an arm **101** on a crank shaft **102** which is arranged for actuation by a key lever **103**, as shown in FIG. 2.

Projecting from the side of the cam **92** opposite the pin **96**, **97** are two pins **105** and **106** which are engageable by a spring arm **108** acting to rotate the cam in a clockwise direction when unlatched. The spring arm is pivotally mounted on the frame members as shown in FIG. 2, and is urged against the cam pins by a spring **110**.

The frame members **84**, **85** are urged by a spring **111** into engagement with a stop **112** in the form of an eccentric which may be adjusted for stopping the frame members at the proper time so the cam may be driven to its latched position in which a clearance is provided between it and the power roll. When the cam **92** is engaged with the power roll and effects a driving of the frame members to the position shown in FIG. 3, a latch **114** engages a lug **115** on the frame member **84** for holding the latter against movement in a clockwise direction. The latch **114** is mounted on a stationary pivot **116** and has a downwardly extending arm **117**. Pivotally mounted on the arm **117** are two members **118** and **119** extending along opposite sides of a pin **120** projecting from the arm **117** near its lower end. A spring **121** urges the members **118**, **119** toward each other into engagement with opposite sides of the pin **120**. The lower ends of the members **118**, **119** normally engage opposite sides of a pin **123** carried by the crank arm **99**. It will be seen that a rocking of the latch **95** causes the pin **123** to act

on one of the members **118, 119** to effect a swinging of the latch **114** in the same direction.

With the parts in positions shown in FIGS. 2 and 3, the head **68** operates to print lower case characters. A depression of the key lever **103** results in a rocking of the latch **95** upwardly out of the path of the pin **96** and into the path of pin **97**. Spring arm **108** acting on pin **105** then swings the cam **92** into engagement with the power roll **93**. A slightly rising surface on the cam causes the frame member to swing first a short distance in a counterclockwise direction to remove the load from the latch **114** and permit the latter to rock upwardly under the action of member **118** on the pin **120**. The cam **92** then permits the frame members to swing under the action of spring **111** until the stop **112** is engaged. Just after this point is reached, spring arm **108** acts on pin **106** to rock cam **92** until the latch **95** engages the pin **97** and the cam is free of the power roll as shown in FIG. 4. The operating mechanisms remain in the positions shown in this figure as long as the key lever is held depressed. A release of the key lever results in its upward movement under the action of a spring **125**. This causes the latch **95** to move out of the path of pin **97** and into the path of pin **96**. Spring arm **108** acts on pin **106** to rock the cam into engagement with the power roll, and a rising surface on the cam causes the members **84, 85** to rock in a counterclockwise direction. Movement of the latch **95** caused the pin **123** to effect a swinging of the latch **114** downwardly to a position in which it engages the lug **115**. Cam **92** is shaped to effect an upward swinging of the frame members until the lug **115** is slightly above the shoulder on latch **114** and then a downward swinging of the frame members to engage the lug with the latch shoulder. The surface on cam **92** drops some from this point so the spring arm **108** acting on pin **105** may rock the cam **92** to a position free of the power roll, as shown in FIG. 3.

While there have been shown and described the novel features of two forms of the invention, it will be understood that it may be modified and embodied in various other forms without departing from the spirit of the invention.

What is claimed is:

1. A case shift mechanism comprising, in combination, a case shiftable part, means for shifting said part between upper and lower case positions, said means including a pivoted member having a roller attached thereto, means for connecting said member to said shiftable part, control means having as an integral part a secondary cam cooperating with said roller, a latching element engageable with said control means when said shiftable part is in one of said case positions, a power roller rotating continuously in one direction, a primary cam engageable with said roller, a cam lever supporting said primary cam, means linking said lever to said control means, a key lever, and means operable by said key lever for controlling the engagement of said primary cam with said power roller and for actuating said latching element.

2. In a typewriting machine having a type carrying member, a mechanism for moving said type carrying member between upper and lower case printing positions comprising, in combination, a lever, means connecting said lever to said type carrying member, a cam member operatively engaging said lever and shiftable relative thereto for effecting movement of said type carrying member between its upper and lower case positions, a power roll rotating continuously in one direction, a power cam engageable with said power roll, a pivoted member rotatably supporting said power cam, means for urging said pivoted member in a direction to engage said power cam with said power roll, an abutment for limiting movement of said pivoted member by said urging means, said power cam having rising and falling cam surfaces extending over opposite portions of its periphery, a pair of latch pins extending from said power cam at angularly spaced points, a latch element engageable with one of said latch pins just after the highest point on said rising cam surface comes into engagement with said power roll and engageable with the other of said latch pins just before the lowest point on said falling cam surface engages said power roll, a key lever, means connecting said key lever to said latch element for moving the latter from a position engaging one of said latch pins to a position in which it is engageable by the other of said latch pins, means connecting said cam member to said pivoted member to be shifted by pivotal movement of the latter, means for latching said cam member when the highest point on said rising cam surface comes into engagement with said power roll, means operable on actuation of said key lever for urging said latching means to an unlatching position, and means yieldingly urging said power cam into engagement with said power roll when said latch element is moved from a position engaging either one of said latch pins.

3. The mechanism of claim 2 in which the surface on said power cam falls away between the highest points on said rising and falling cam surfaces, and the highest point on said falling cam surface is slightly higher than the corresponding point on said rising cam surface whereby the load is removed from said latching means to permit its unlatching operation.

4. In a typewriting machine having a type basket, a mechanism for moving said type basket between upper and lower case positions comprising, in combination, a positioning lever, means connecting one end of said lever to said basket, a control lever, a cam member fixed to said control lever and engaging the other end of said positioning lever, means yieldingly urging said basket to its upper case position, said cam member operable on movement of said control lever in one direction to force said basket to its lower case position and operable on movement of said control lever in the opposite direction to control movement of said basket to its upper case position, means for latching said control lever when said basket is moved to its lower case position, power actuated means for moving said control lever, said power actuated means comprising a power roll rotating continuously in one direction, a power cam engageable with said power roll, a cam lever rotatably supporting said power cam, means linking said cam lever to said control lever, means yieldingly urging said power cam into engagement with said power roll, a latch element for holding said power cam free of said power roll, a key lever operable to disengage said latch element from said power cam, and means connecting said key lever to said latching means for urging the latter to an unlatching position when said key lever is actuated.

5. In a typewriting machine having a single element type head, a mechanism for positioning said single element type head to present either upper or lower case characters for printing comprising, in combination, a lever, means operatively connecting said lever to said type head, a pivoted frame member, a cam member fixed to said frame member and operatively engaging said lever for actuating the latter, a power roll rotating continuously in one direction, a power cam rotatably supported by said frame member in position to be driven by said power roll, said power cam having rising and falling cam surfaces extending over opposite portions of its periphery, a latch element engageable with said power cam for latching the latter in positions between said surfaces, means for latching said frame member in a position to which it is driven by engagement of said power cam with said power roll, means yieldingly urging said frame member in the opposite direction, a stop limiting movement of said frame member by said yielding means, a key lever, and means operating on actuation of said key lever for releasing said latch element and said latching means.

6. In a typewriting machine having a type carrying member, a mechanism for moving said type carrying

member between upper and lower case printing positions comprising, in combination, means for yieldingly urging said member toward one of said positions, means including a cam member movable in one direction for forcing said type carrying member to the other of said positions against the action of said yielding means and movable in the opposite direction for controlling the rate of movement of said type carrying member under the action of said yielding means, a power roll rotating continuously in one direction, means including a power cam engageable with said power roll for positively moving said cam member in said one direction and controlling its movement in the opposite direction, latching means engageable with said power cam for holding the latter free of said power roll, and a key lever operable to release said latching means.

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