

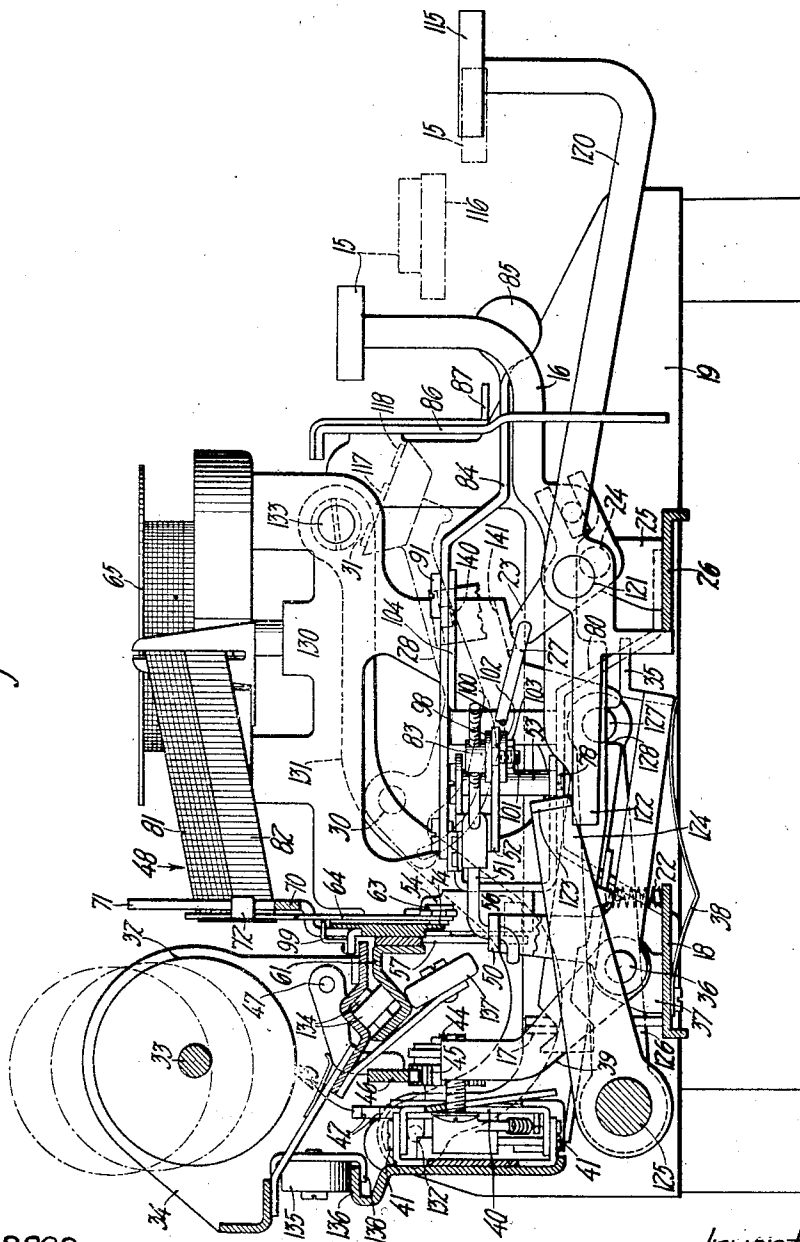
1,370,281.

G. W. CAMPBELL.
TYPEWRITING MACHINE.
APPLICATION FILED JUNE 14, 1918.

Patented Mar. 1, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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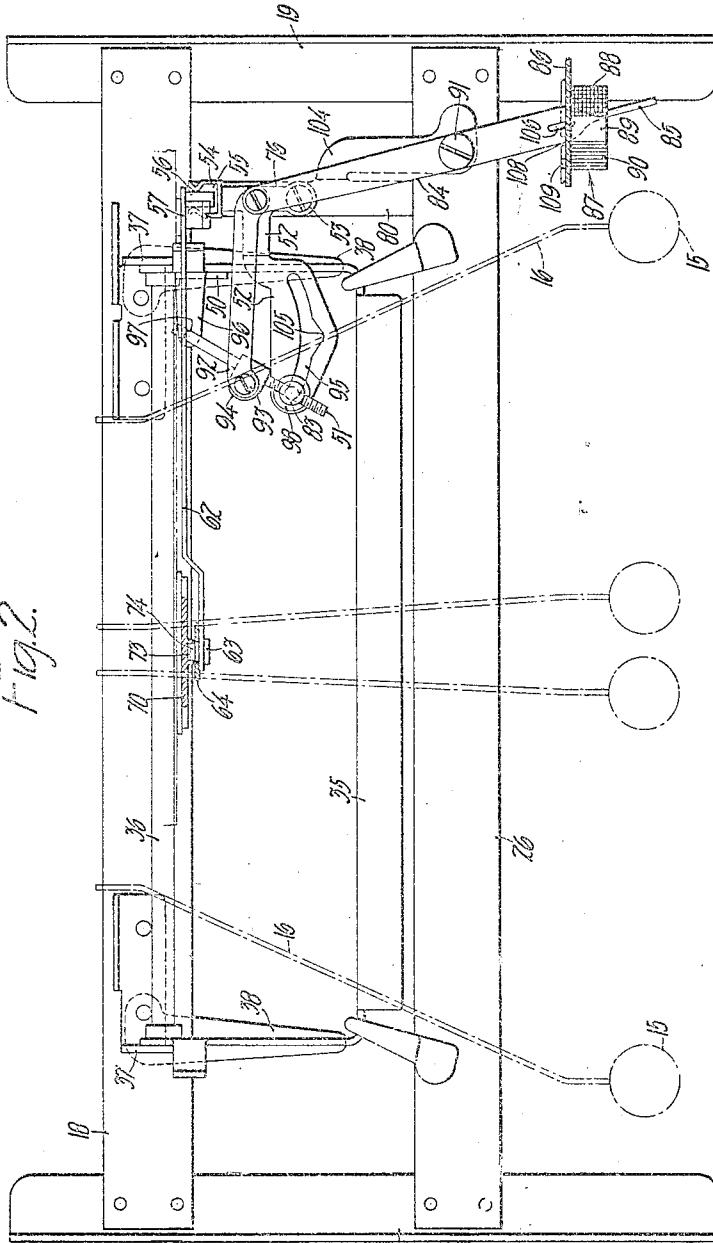


Fig. 2.

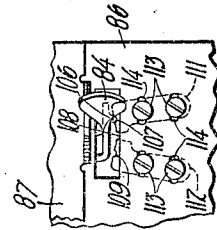


Fig. 3.

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5 SHEETS—SHEET 3.

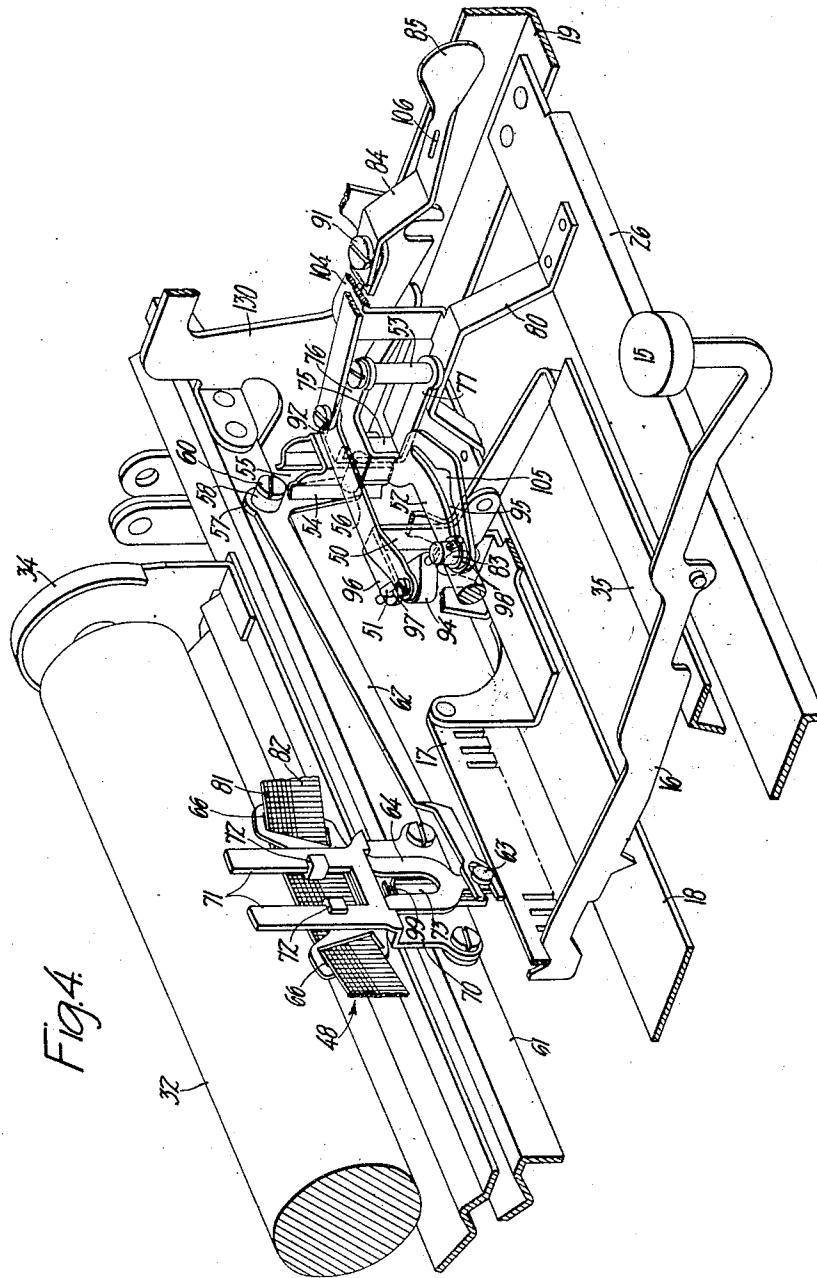


Fig. 4.

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5 SHEETS—SHEET 4.

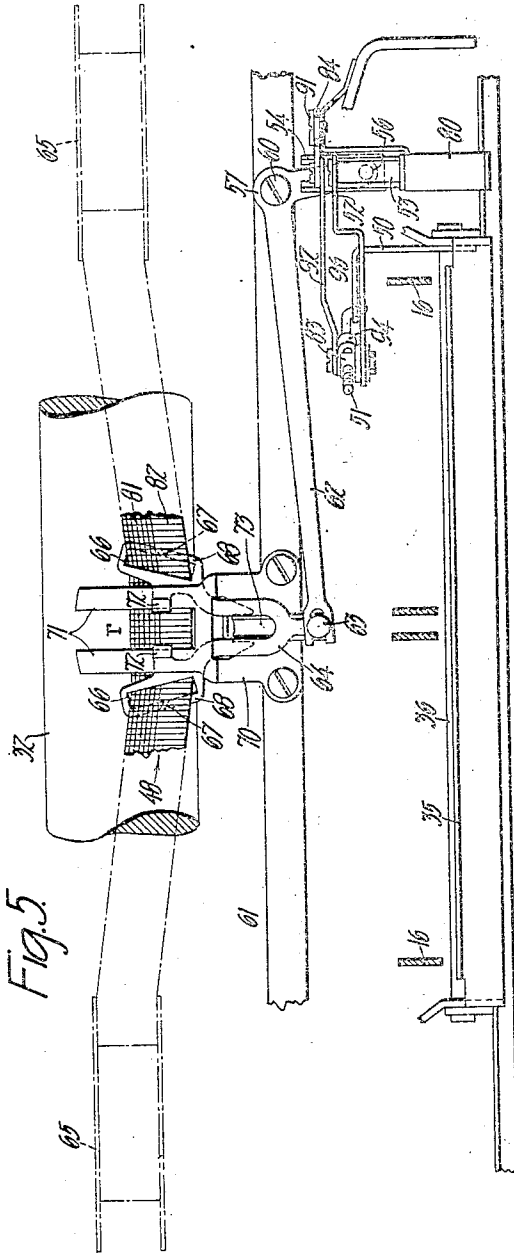


Fig. 5.

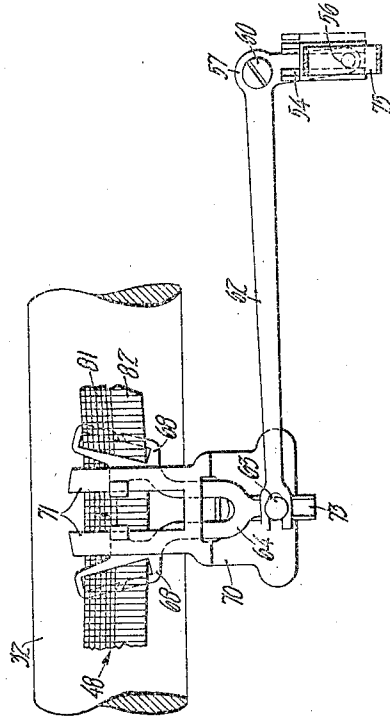


Fig. 6.

Witnesses:

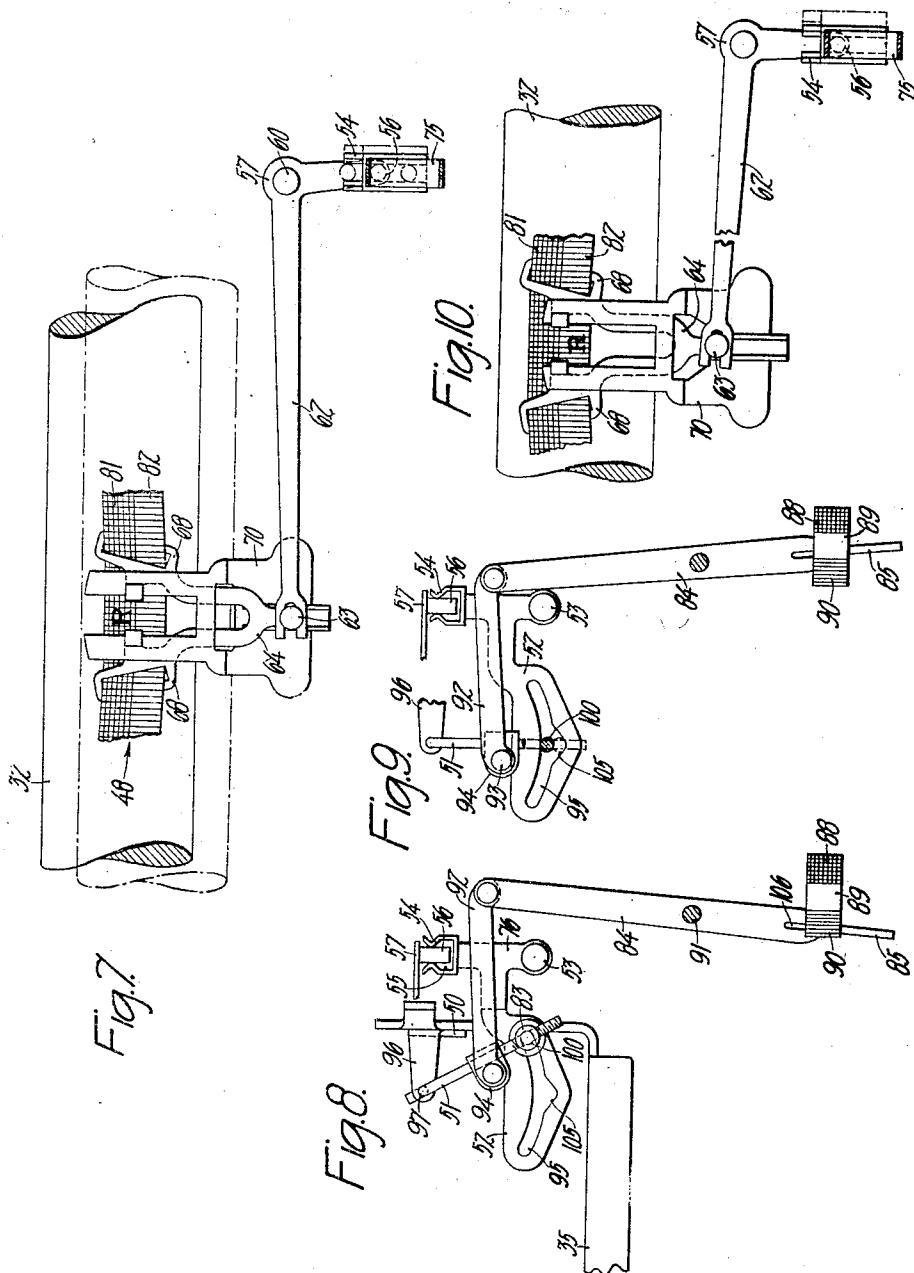
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GEORGE W. CAMPBELL, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD
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TYPEWRITING-MACHINE.

1,370,281.

Specification of Letters Patent.

Patented Mar. 1, 1921.

Application filed June 14, 1918. Serial No. 240,000.

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 ribbon-vibrating mechanism, and is illustrated as supplied to a small, portable typewriting machine, in which the platen may occupy any one of three case-shift positions.

In the illustrated machine, the platen is supported upon a frame which is shiftable relatively to a main frame. I have preferably mounted most of the ribbon-vibrating mechanism in a compact and convenient manner on the main frame of the machine; the ribbon-vibrator and an actuating lever therefor being supported upon the shiftable frame, and the actuating lever being connected to the mechanism on the stationary main frame in a manner to permit a relative shifting movement therebetween when the platen is shifted, without changing the position of the ribbon-vibrator relatively to the platen during case-shifting movements thereof. The connection between said ribbon-vibrating lever and the ribbon-vibrating mechanism on the machine frame is of such a nature that the shifting movement of one relatively to the other has no effect upon the throw imparted to the ribbon-vibrator by the type-keys.

Improved and simplified means is also provided to vary the throw of the ribbon-vibrating lever to expose either one of two fields of a bicolor ribbon to the printing point during typing. This is done by means of a color-control-handle arranged at the front of the machine, which is moved to change the point of connection of an actuating link extending from the universal bar and connected to a lever, which forms part of the ribbon-vibrating mechanism.

The invention further provides means to prevent the operation of the ribbon-vibrator, which is desirable when making stencils. This may be done by shifting the point of connection of the actuating link to a position where it is ineffective upon said lever.

Improved and simplified means is also

provided to hold the color-control-handle in different positions.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side view, taken near the right-hand side, of a front-strike portable typewriting machine, embodying the present improvements.

Fig. 2 is a plan view showing the main frame, a universal bar supported thereby, character keys which actuate the universal bar, and ribbon-vibrating mechanism connected to the latter. This figure also shows the control handle to vary the point of connection of the link extending from the universal bar to the ribbon-vibrating mechanism, to render either field of the ribbon effective or both fields ineffective, the mechanism being set to vibrate the black field to the printing point.

Fig. 3 is a detail front view of the color control handle, showing a detent for holding the handle in various positions to which it may be moved.

Fig. 4 is a skeleton perspective view of the machine as viewed from the forward, upper left-hand corner, some of the parts being broken away.

Fig. 5 is a front view, with the platen in its lower-case position, showing the connection from the universal bar to the ribbon vibrator in normal position relative to the platen.

Fig. 6 is a similar view, showing the black field of the ribbon vibrated to the printing point.

Fig. 7 is a front view, showing the platen and the ribbon-vibrating lever shifted to their middle-case positions, and the ribbon vibrator actuated to expose the black field of the ribbon to the printing point.

Fig. 8 is a plan view, showing the color control handle set to red and the point of connection of the actuating link moved close to the fulcrum of the intermediate lever with which said link is associated.

Fig. 9 is a similar view, showing the control handle moved to set the connecting link to a neutral or ineffective position.

Fig. 10 is a front view with the platen in its middle case position and the red field of the ribbon vibrated to the printing point.

Character keys 15, when actuated, move

key-levers 16 about a common fulcrum-plate 17 supported on a cross-bar 18, extending between the sides 19 and 20 of a main frame 21. The key-lever 16, when
 5 actuated, moves against the tension of a spring 22 to swing a bell-crank 23 about a fulcrum 24 on a bracket 25 secured to a cross-bar 26, also extending between the sides 19 and 20 of the main frame. The
 10 bell-crank 23 pulls on a link 27 to swing a type-bar 28 about a fulcrum 30 to cause the types 31 to strike against the front side of a platen 32.

The platen is rotatably supported by a
 15 platen axle 33, on a carriage 34, which may be urged from right to left in the usual manner by a spring drum (not shown). To cause the carriage to move from one letter-space position to another, while typing,
 20 there is provided a universal bar 35, with which the key-levers 16 engage to swing said universal bar about the axis of a fulcrum rod 36 pivotally supported by brackets 37, one at each end thereof, secured to the cross-bar 18. The universal bar 35, when actuated,
 25 moves against the tension of suitable return springs 38, and an upwardly-extending arm 39 thereof engages with a horizontally-disposed dog-rocker 40, to cause the
 30 latter to swing about pivots 41, forming a vertical axis for said dog-rocker, and also cause suitable dogs to reciprocate between the teeth 42 of an escapement wheel 43, said escapement wheel being secured to a shaft
 35 44 having a pinion 45 thereon which meshes with a feed rack 46 pivotally supported on the carriage 34 at 47. As the carriage is constantly urged from right to left, the escapement wheel is rotated step by step
 40 through the intermediary of said rack 46 and pinion 45 to effect letter-space movements of the carriage 34 by vibrating the dogs on the dog-rocker between the teeth of said escapement wheel.

45 At each type-stroke, a ribbon 48 is moved into the path of the striking type-bars 28. This movement of the ribbon is effected by the universal bar 35 having an upwardly-extending arm 50, which, as the universal
 50 bar is actuated, thrusts a connecting link 51 forwardly to rock an intermediate lever 52 about a pivot 53, the latter being in the form of a shouldered screw; said intermediate lever having a portion 54 forming a
 55 vertical channel or slot 55, into which projects a stud or wrist 56 to swing a ribbon-vibrating lever in the form of a bell-crank 57 about its pivot, comprising a hub 58 on a shouldered screw 60 threaded into a front
 60 guide rail 61 for the typewriter carriage. Said ribbon-vibrating lever has a horizontally-disposed arm 62 projecting inwardly toward the middle of the machine, the free end of which engages with a stud 63 on a

ribbon-vibrator 64 to move the latter upwardly to expose the ribbon 48 to the printing point. The stud 56 and channel 55 form a pin-and-slot or slip-joint connection between the parts of the ribbon mechanism mounted in the shift frame and the parts
 70 mounted in the main frame, so as to permit free movement of the shift frame from one case position to another while maintaining an invariable movement-transmitting connection for all case positions of the shift
 75 frame.

The ribbon may be fed from one to another of two spools 65 in any convenient manner during typing, and guided through suitable slots 66, in the ribbon-vibrator, into
 80 which it may be inserted through suitable openings 67 formed in guide bars 68 of said ribbon-vibrator.

To guide the ribbon-vibrator 64 in its movements to and away from the printing
 85 point, there is provided a guide 70 secured to the front guide-rail 61, said guide 70 comprising two upwardly extending fingers 71, which are partially surrounded by ears 72 on the ribbon-vibrator. To guide the lower
 90 end of the ribbon-vibrator, and thus prevent any sidewise movement thereof while it moves up and down, the guide 70 is provided with a slot or groove 73, into which projects the inner end 74 of the stud 63 on said vibrator, Fig. 2. The hub 58 on the ribbon-vibrator-lever forms a substantially broad bearing therefor, and thus prevents said lever from wiggling when actuated. Thus,
 95 the free end of said ribbon-vibrator-lever guides the lower end of said ribbon-vibrator against any accidental movement from the front to the back of the machine.

The intermediate lever 52 comprises a back 75, Fig. 4, to which the U-shaped member 54 is rigidly secured. The back 75 has
 105 extending forwardly therefrom two ears 76 and 77 with a sufficient space between them, so that with the shouldered screw 53 they form a substantially broad bearing for said lever 52. The screw 53 has a reduced portion 78 threaded into a bridge 80 secured to the cross-bars 18 and 26 extending between side plates 19 and 20 of the main frame 21.

The ribbon 48 comprises two fields, preferably, a black field 81 and a red field 82. Either one of these fields may be brought to the printing point during typing. This may be accomplished selectively, by changing the point of connection comprising a stud 83
 120 between the link 51 and the intermediate lever 52 by means of a color control lever 84 which has a finger-piece 85 projecting beyond a front plate 86, Figs. 1 and 2, of the machine; the lever 84 being settable by
 125 said finger-piece to any one of three positions relative to an indicator plate 87 having marks 88, 89 and 90, indicating a black po-

sition, a neutral position and a red position, respectively, to which said lever 84 may be moved.

The control lever normally occupies the position indicated in Fig. 2, where it is set to the black mark 88 and is effective to hold the connecting link 51 with its point of connection 83 near the outer end of the intermediate lever 52.

When it is desired to render the red field 82 of the ribbon effective, the finger-piece or handle 85 is moved to the red mark or indicator 90, thus swinging the control lever 84 about its pivot 91 to draw on a link 92 which is pivotally connected by a shouldered screw 93 to a block 94 secured to said connecting link 51. This swings the link 51 to bring the point of connection 83 thereof to the other end of a slot 95, formed in the intermediate lever 52, to the position in Fig. 8; thus the point of connection 83 of the connecting link 51 is brought nearer to the fulcrum 53 of said intermediate lever 52 and consequently the universal bar, which is actuated always through the same distance by the numeral keys, will be effective to swing the intermediate lever 52 through a greater angular distance about its fulcrum 53, thus imparting a greater angular movement to the ribbon-vibrating lever 57 to raise the ribbon vibrator 64 through a greater distance and expose the red field 82 of the ribbon to the printing point, as indicated in Fig. 10. The upper-end 96 of the arm 50, extending from the universal bar, is bent so as to lie in a substantially horizontal plane, so that the link 51 may be readily shifted about its pivot 97.

To prevent overthrow of the ribbon when the red field thereof is vibrated to the printing point, there is provided a stop 99 with which the inner end of the stud on the ribbon-vibrator lever engages. This stop may be secured near the upper end of the slot 73 in any convenient manner.

To permit an adjustment in the length of the connecting link 51, so that the effective length thereof may be made equal to the radius of the curved slot 95, one end of said link is threaded into the stud 83 which forms the point of connection between said link and said intermediate lever. The connection between said stud 83 and said intermediate lever 52 may comprise a flange 98. Fig. 1, on said stud which lies above said intermediate lever 52. A shoulder 100 extends from said flange and through the slot 95; the length of said shoulder being a little greater than the thickness of said lever. A reduced threaded stem 101 extends from said shoulder, and a washer 102 is held tight against said shoulder by means of a nut 103 threaded on said stem. With this construction, a readily shiftable connection to said intermediate lever 52 is had.

The pivot 91 of the control lever 84 may comprise a shouldered screw threaded into an upwardly and forwardly-projecting arm 104 extending from the bridge 80 which forms a support for the intermediate lever 52.

To nullify the effect of the universal bar on the ribbon vibrator, so as to prevent the actuation of said vibrator during stenciling, the control lever 84 may be moved to the neutral mark 89 which is preferably white. This movement of the control lever is effective to move the point of connection or stud 83 to a central position, Fig. 9, in the slot 95 of the intermediate lever 52. It will be noticed that the slot 95 at this place is formed with a depression or enlargement 105, so as to permit the shoulder 100 of the stud 83 to move idly back and forth when actuated by the universal bar 35, thus permitting the actuation of the type-keys 15 without actuating the ribbon vibrator 64, and, consequently, the ribbon 48 remains ineffective during typing.

To maintain the control lever 84 in its black, neutral or red positions to which it may be set, it is provided at its under side with a projection or rib 106 which may engage in notches 107, 108 and 109, respectively. The notches 107 and 109 are formed in two adjustable members 111 and 112 secured to the front plate 86 by screws 113 which pass through slots 114 in said front plate; said screws being threaded into said adjustable members. The notch 108 for maintaining said control lever 84 in its neutral position is formed between the two adjustable members. The forward portion of the operating lever 84 is slightly flexible, so as to yield to permit the rib 106 to move out of one notch and into another when said lever is shifted to the different positions.

It is preferable to increase the holding effect on said control lever 84 when it is moved to its red or black positions, so as to avoid any possible accidental shifting of the control lever, which may be caused by the movement of the connected parts during typing.

To do this, it will be seen, by an inspection of Fig. 3, that the notches 107 and 109 for holding the control lever in the black and red positions are higher than the notch 108 which holds the control lever in a neutral position. This is for the purpose of increasing the tension on the forward part of the control lever when it is moved from the neutral position to either the black or red positions, thus increasing the holding effect of said control lever.

The platen 32 may be shifted by shift keys 115 and 116 from lower-case position to a middle-case position and an upper-case position, so that the types 117 and 118, respectively, may be caused to print. To shift

the platen to the middle-case position, the shift key 115 is actuated to swing a lever 120 about its pivot 121 and cause a rearwardly-projecting arm 122 thereof to engage with an ear 123 of an arm 124 secured to a shaft 125 to rock the latter which is carried between the side plates 19 and 20 of the main frame 21. The rock shaft 125 has rigidly mounted thereon two forwardly-projecting arms 126, one at each side of the machine. The forward ends of said arms 126 are provided with studs 127 which project into slots 128 of a shift frame 130 forming a connection by which the shift frame 130 may be moved upwardly, the shift frame 130 being guided in its upward movement by links 131, one at each side of the machine, said links being pivoted to the main frame at 132 and to the shift frame by a detachable screw 133.

It will be seen by an inspection of Fig. 1 that the carriage 34 travels on rollers 134 and 135 coöperating with the front guide rail 61 and a rear rail 136 respectively; both rails being secured to the shift frame 130. The carriage is held for traveling movements on said rails of the shift frame by a roller 137 engaging on the under side of the front guide rail 61 and a finger 138 engaging on the under side of the rear rail 136.

A stop 140 with which an ear 141 on the shift frame may engage is provided to locate the platen 32 in its middle-case position. When the platen is shifted to its upper-case position, however, this stop is rendered ineffective, and the platen may be located in its upper-case position by means of another stop, not shown.

It is desirable during case-shifting movements of the platen to shift the ribbon therewith, so as not to disturb the position thereof relative to the printing point of the platen.

To do this, the ribbon vibrator 64 and the ribbon-vibrator lever 57 are preferably supported on the front rail 61 which is secured to the shift-frame. Thus, the ribbon vibrator 64 and the actuating lever 57 move with the shift-frame, during a case-shifting operation, at which time the stud 56 on said lever moves lengthwise of the slot 55, formed in the U-shaped member 54 of the intermediate lever 52, the latter, it will be remembered, being supported on the main frame. The vertical length of the U-shaped member 54 is great enough to permit the stud 56 to occupy three positions therein (Fig. 7), corresponding to lower-case, middle-case and upper-case positions of the platen.

The shift-frame 130 with the mechanism carried thereby, including the ribbon-vibrator lever 62, comprises one unit, and the main frame with the mechanism carried thereby, including the intermediate lever,

comprises another unit. It will be seen that these two units may be readily assembled by setting the shift-frame on the studs 127 and connecting the links 131 by means of the screws 133, and at the same time the ribbon-vibrator lever is connected to the intermediate lever 52 by sliding the stud 56 on the ribbon-vibrator lever into the slot 55 of the U-shaped member 54 on said intermediate lever 52.

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 main frame, a shift frame movable to different case positions relative to said main frame, ribbon-vibrating mechanism mounted in said shift frame, operating means for said vibrating mechanism mounted in said main frame, and a slip-joint connection between said ribbon-vibrating mechanism and said operating means, the component elements of said connection including a straight movement-transmitting guideway substantially parallel to the direction of movement of the shift frame and a movement-transmitting member relatively movable along and coöperative with the guideway to permit free movement of said shift frame from one case position to another while preserving an invariable movement-transmitting connection between said ribbon-vibrating mechanism and its operating means, for different case positions of said shift frame.

2. In a typewriting machine, in combination, a main frame, a shift frame movable to different case positions relative to said main frame, ribbon-vibrating mechanism mounted in said shift frame, operating means for said vibrating mechanism mounted in said main frame, said operating means including a lever mounted for rotation about an axis parallel to the direction of movement of said shift frame, and a pin-and-slot connection between an arm of said lever and a movable element of said vibrating mechanism, to permit relative movement between the connected parts, in a direction parallel with said axis, while preserving an invariable movement-transmitting connection between said ribbon-vibrating mechanism and said operating means, for different case positions of said shift frame.

3. In a typewriting machine, in combination, a main frame, a shift frame movable to different case positions relative to said main frame, ribbon-vibrating mechanism mounted in said shift frame, operating means for said vibrating mechanism mounted in said main frame, said operating means including selectively adjustable means for

varying the amplitude of ribbon vibration, and a slip-joint connection between said ribbon-vibrating mechanism and said operating means, the component elements of said connection including a straight movement-transmitting guideway substantially parallel to the direction of movement of the shift frame and a movement-transmitting member relatively movable along and cooperative with the guideway as to permit free movement of said shift frame from one case position to another while preserving an invariable movement-transmitting connection between said ribbon-vibrating mechanism and its operating means, for different case positions of said shift frame.

4. The combination with a platen, of a ribbon vibrator, keys, a vertically swinging universal bar having an arm swinging substantially horizontal, a horizontally swinging lever, a link connecting said arm and said lever, a vertically swinging lever connected to said horizontally swinging lever to transfer movement from said universal bar to said ribbon vibrator, and means for varying the connection between said link and said horizontally swinging lever to vary the throw imparted by said universal bar to said ribbon vibrator.

5. The combination of a platen, a ribbon vibrator, keys, a vertically swinging universal bar having an arm swinging substantially horizontal, a horizontally swinging lever, a link connecting said arm and said lever, a vertically swinging lever connected to said horizontally swinging lever to transfer movement from said universal bar to said ribbon vibrator, means for varying the connection between said link and said horizontally swinging lever to vary the throw imparted by said universal bar to said ribbon vibrator, and means for retaining said connection in its various positions.

6. In a typewriting machine, in combination, a main frame, a shift frame movable to different case positions relative to said main frame, a ribbon-vibrator mounted in said shift frame, a set of keys mounted in said main frame, and means controlled by said keys for operating said ribbon-vibrator, said operating means comprising a lever mounted in said shift frame, rotatable about an axis perpendicular to the direction of movement of said shift frame, a second lever mounted in said main frame, rotatable about an axis parallel with the direction of movement of said shift frame, and a slip-joint connection between an arm of one of said levers and an arm of the other, to permit relative movement in the direction of movement of said shift frame, but capable of maintaining an invariable operating connection from one of said levers to the other.

7. In a typewriting machine, in combination, a main frame, a shift frame movable

to different case positions relative to said main frame, ribbon-vibrating mechanism mounted in said shift frame, and operating means for said vibrating mechanism mounted in said main frame, said operating means comprising a set of keys, a universal bar to be operated by any of said keys, a lever mounted for rotation about an axis parallel to the direction of movement of said shift frame, and a variably settable operating connection between said universal bar and said lever for varying the amplitude of ribbon vibration, there being a slip-joint connection between an arm of said lever and a movable element of said vibrating mechanism to permit relative movement between the connected parts in a direction parallel with said axis, while preserving an invariable movement-transmitting connection between said ribbon-vibrating mechanism and said operating means, for different case positions of said shift frame.

8. The combination of a platen, case-shifting means comprising a shift frame, a main frame, a ribbon vibrator carried by said shift frame, keys, a universal bar for said keys, a horizontally swinging lever pivotally mounted on said main frame, said lever having a vertical slot therein, and a vertically swinging lever connected to said ribbon vibrator and supported by said shift frame, said vertically swinging lever having an extension projecting into the slot of said horizontally swinging lever, said slot being elongated to permit a relative shifting movement of said vertically swinging lever during case-shifting operations.

9. The combination of a platen, case shifting means, a ribbon vibrator, keys, a universal bar for said keys, means comprising a bell crank swingable about a vertical axis, another bell crank swingable about a horizontal axis to transfer movement from said universal bar to said ribbon vibrator, and case shifting means, said bell-cranks having a pin-and-slot connection to permit a shifting movement of one bell crank relative to the other by said case shifting means.

10. The combination of a platen, case-shifting means, a ribbon-vibrator, keys, a universal bar for said keys, an upwardly-extending arm on said universal bar, a link extending forwardly from said arm, a horizontally-disposed intermediate lever to which said link is connected, and a vertically-disposed lever connected to said horizontally-disposed lever, said last-mentioned lever engaging with said ribbon-vibrator, said levers having a pin-and-slot connection to permit a relative shifting movement of one relative to the other during case-shifting operations.

11. In a typewriting machine, in combination, ribbon-vibrating mechanism, operating mechanism therefor, and variably set-

table means for varying the relation of parts of said operating mechanism, so as to vary the amplitude of ribbon vibration, said settable means comprising a lever having a flexible arm, and retaining means therefor having spaced notches to receive and hold said arm in different set positions, one of said notches being so positioned as to hold said arm flexed to a greater extent than when retained in another of said notches, so as to produce an increased holding effect.

12. The combination with a platen, of a bichrome ribbon, a ribbon-vibrator, actuating means for said ribbon-vibrator, means to vary the throw imparted to said ribbon-vibrator by said actuating means, said last-mentioned means comprising a finger-piece, which may be moved to a neutral position, a black position and a red position, and holding means for said finger-piece, said holding means being comprised of two adjustable elements, one of said elements having a notch corresponding to the black position of said finger-piece, the other element having a notch corresponding to the red position of said finger-piece, a notch corresponding to the neutral position of said finger-piece being formed between said two elements.

13. The combination with a platen, of a bichrome ribbon, a ribbon-vibrator, actuating means for said ribbon-vibrator, means to vary the throw imparted to said ribbon-vibrator by said actuating means, said last-mentioned means comprising a finger-piece adapted to occupy a neutral position and movable in one direction to a black position and in the other direction to a red position, the means connecting said universal bar with said ribbon vibrator comprising a shiftable link which is movable to any one of the three positions corresponding to the neutral, black and red positions, and means for maintaining said finger-piece in any one of its three positions, said means being adapted to increase the holding effect on said finger-piece when it is moved from its neutral position to either the black or the red position.

14. The combination with a platen, of a bichrome ribbon, a ribbon-vibrator, actuating means, including a universal bar, for said ribbon-vibrator, means to vary the throw imparted to said ribbon-vibrator by said actuating means, said last-mentioned means comprising a finger-piece adapted to occupy a neutral position and movable in one direction to a black position and in the other direction to a red position, means connecting said universal bar with said ribbon-vibrator comprising a shiftable link which is movable to any one of the three positions corresponding to the neutral, black and red positions, means for maintaining said finger-piece in any one of its three positions, said means comprising two adjustable elements

having faces inclined toward each other, each face having a depression therein, a third depression formed between said elements, and a projection on said finger-piece adapted to engage any one of said depressions.

15. In a typewriting machine, in combination, ribbon-vibrating mechanism, operating mechanism therefor, and variably settable means for changing the relation of parts of said operating mechanism, so as to effect a normal vibration, an amplified vibration, or no vibration of said ribbon, depending upon the setting, said settable means comprising a lever having a flexible arm, and retaining means therefor having three spaced notches therein to receive and hold said arm in different set positions, the notches, corresponding with settings to effect normal vibrations and amplified vibrations, being so positioned as to hold said arm flexed to a greater extent than when retained in the notch corresponding to the setting for no vibration, so as to produce increased holding effect for the settings which are determinative of ribbon vibrations.

16. In a typewriting machine, in combination, a main frame, a shift frame movable to different case positions relative to said main frame, ribbon-vibrating mechanism mounted in said shift frame, operating means for said vibrating mechanism mounted in said main frame, and a pin-and-slot connection between said ribbon-vibrating mechanism and said operating means, the component elements of said connection being so related as to permit free movement of said shift frame from one case position to another, while preserving an invariable movement-transmitting connection between said ribbon-vibrating mechanism and its operating means, the slot of said operating connection being open at one end to facilitate the removal of the shift frame and vibrating mechanism, mounted therein, from the main frame and operating means, when disassembling the machine.

17. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, a vertically-slotted oscillator pivoted upon a vertical axis on the stationary framework of the machine to engage a wrist projecting from said ribbon-vibrating arm and operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and an operating connection from said universal bar to said oscillator.

18. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage

and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, a vertically-slotted oscillator pivoted upon a vertical axis on the stationary framework of the machine to engage a wrist projecting from said ribbon-vibrating arm and operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said oscillator; manually operable means being provided to shift said link relatively to the axis upon which said oscillator turns, to vary the stroke of the oscillator and ribbon at the strokes of the type-keys.

19. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, a vertically-slotted oscillator pivoted upon a vertical axis on the stationary framework of the machine to engage a wrist projecting from said ribbon-vibrating arm and operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said oscillator; manually operable means being provided to shift said link relatively to the axis upon which said oscillator turns, to vary the stroke of the oscillator and ribbon at the strokes of the type-keys, said shiftable link being also shiftable to a position in which the movement of the oscillator is not communicated to the ribbon-vibrating arm.

20. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, an oscillator pivoted upon a vertical axis on the stationary framework of the machine and provided with a vertical guideway having a vertical sliding engagement with said ribbon-vibrating arm to operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and an operating connection from said universal bar to said oscillator.

21. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, an oscillator pivoted upon a vertical axis on the stationary framework of the machine and provided with a vertical guide-

way having a vertical sliding engagement with said ribbon-vibrating arm to operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said oscillator; manually-operable means being provided to shift said link relatively to the axis upon which said oscillator turns, to vary the stroke of the oscillator and ribbon at the strokes of the type-keys.

22. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating arm pivoted on said frame to shift up and down therewith, an oscillator pivoted upon a vertical axis on the stationary framework of the machine and provided with a vertical guideway having a vertical sliding engagement with said ribbon-vibrating arm to operate said arm the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said oscillator; manually-operable means being provided to shift said link relatively to the axis upon which said oscillator turns, to vary the stroke of the oscillator and ribbon at the strokes of the type-keys, said shiftable link being also shiftable to a position in which the movement of the oscillator is not communicated to the ribbon-vibrating arm.

23. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating lever pivoted on said frame to shift up and down therewith, an operating lever pivoted on the stationary framework of the machine, one of said levers being pivoted upon a vertical axis and provided with a vertical guideway engageable with the other said lever to operate the ribbon-vibrating lever the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and an operating connection from said universal bar to said operating lever.

24. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating lever pivoted on said frame to shift up and down therewith, an operating lever pivoted on the stationary framework of the machine, one of said levers being pivoted upon a vertical axis and provided with a vertical guideway engageable with the other said lever to operate the ribbon-vibrating lever the same at all case positions of the carriage and its frame,

a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said operating lever; manually-operable means being provided to shift said link relatively to the axis upon which said operating lever turns, to vary the stroke of the operating lever and ribbon at the strokes of the type-keys.

25. In a front-strike typewriting machine, the combination of a platen-carriage, a frame along which it travels, said carriage and frame shiftable to a plurality of case positions, a ribbon-vibrating lever pivoted on said frame to shift up and down therewith, an operating lever pivoted on the stationary framework of the machine, one of said levers being pivoted upon a vertical axis and provided with a vertical guideway engageable with the other said lever to oper-

ate the ribbon-vibrating lever the same at all case positions of the carriage and its frame, a universal bar operable by the keys of the typewriter, and a shiftable link connecting said universal bar to said operating lever; manually-operable means being provided to shift said link relatively to the axis upon which said operating lever turns, to vary the stroke of the operating lever and ribbon at the strokes of the type-keys, said shiftable link being also shiftable to a position in which the movement of the operating lever is not communicated to the ribbon-vibrating lever.

GEORGE W. CAMPBELL.

Witnesses:

W. A. DOBSON,
M. S. EAKIN.