J. C. McLAUGHLIN.

TYPE WRITING MACHINE.

APPLICATION FILED APR. 30, 1915.

1,211,467.

Patented Jan. 9, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

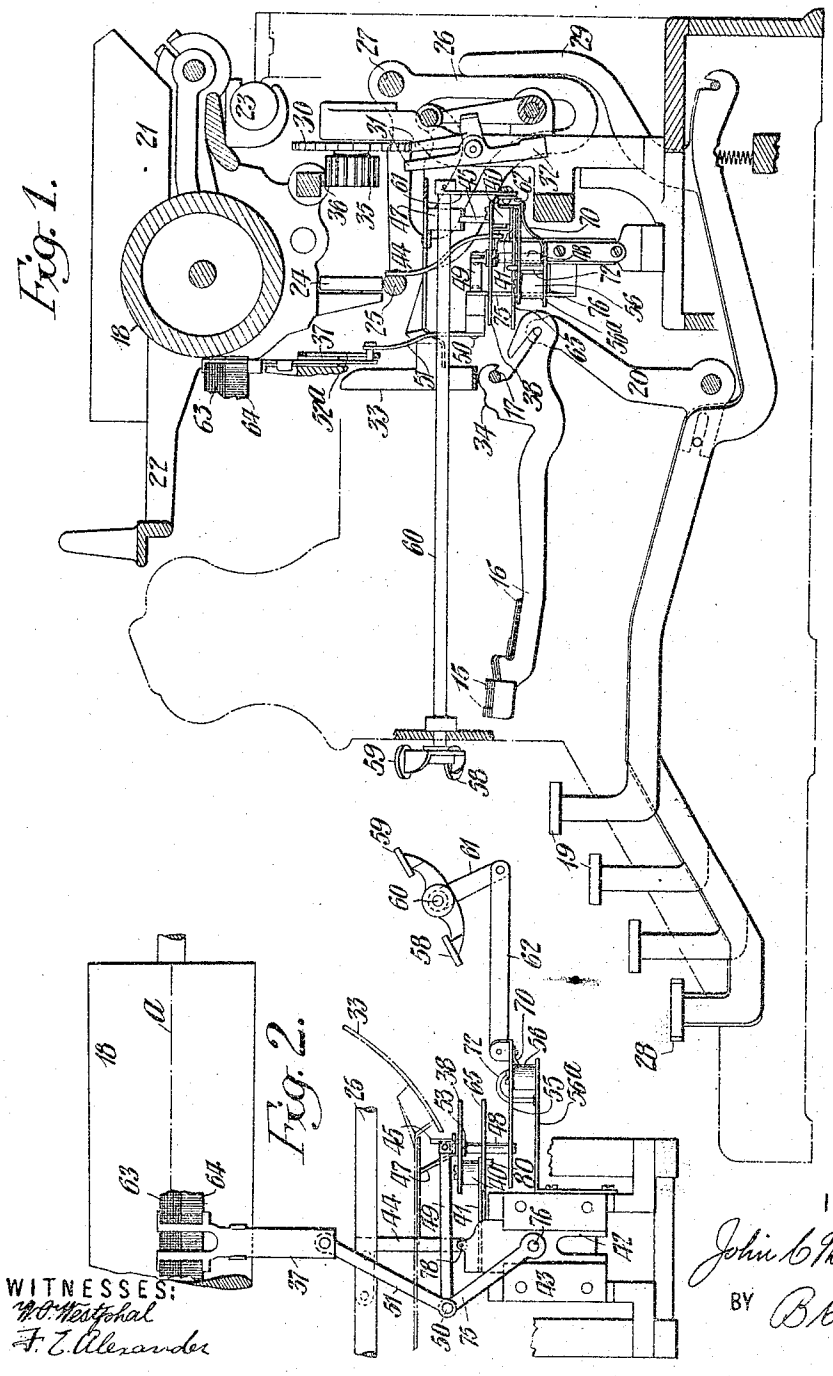


Fig. 2.

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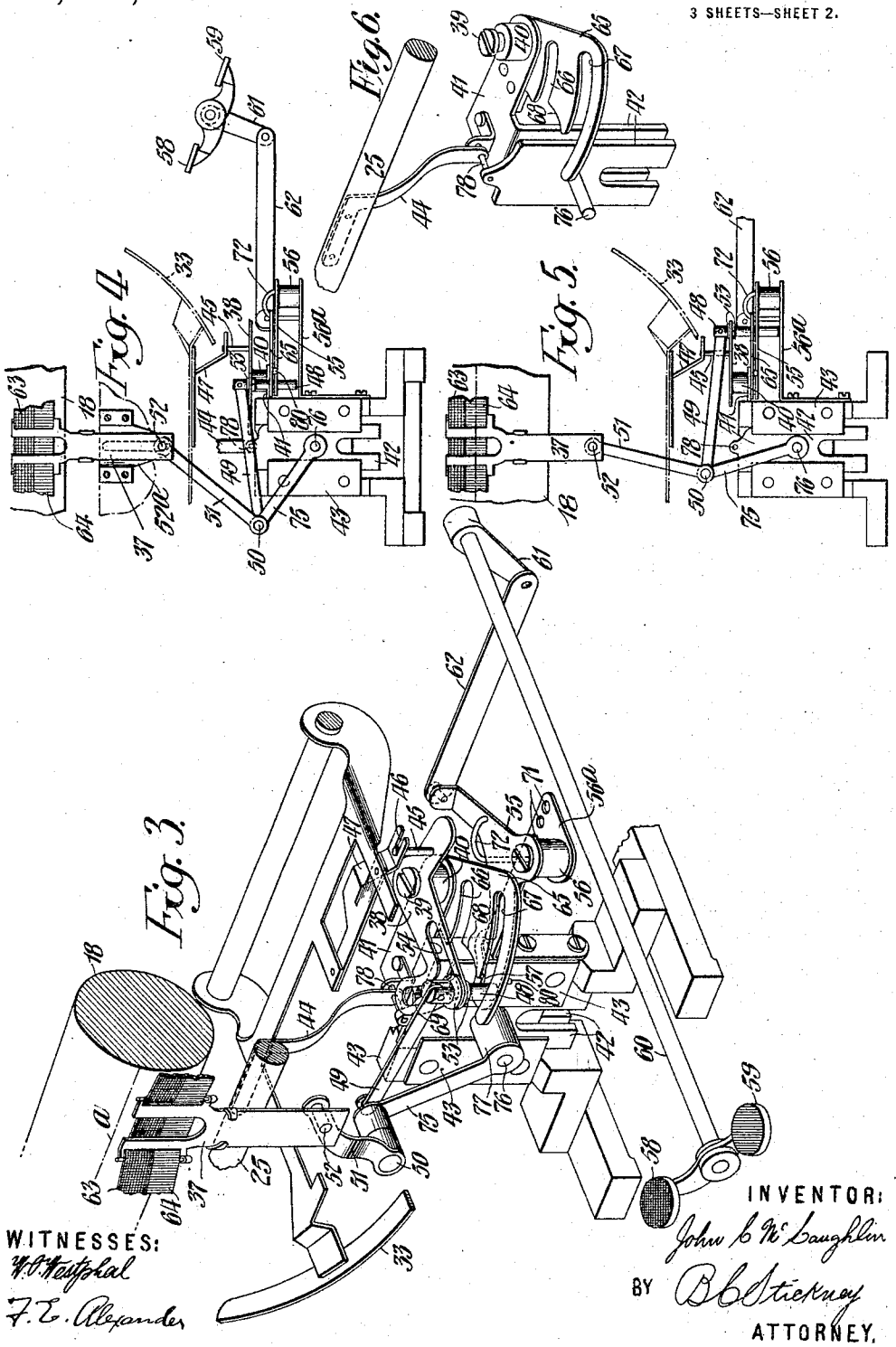
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 9.

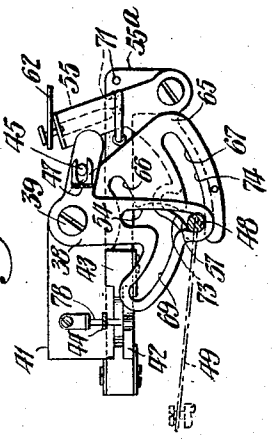


Fig. 12.

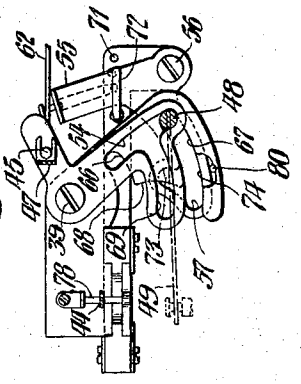


Fig. 8.

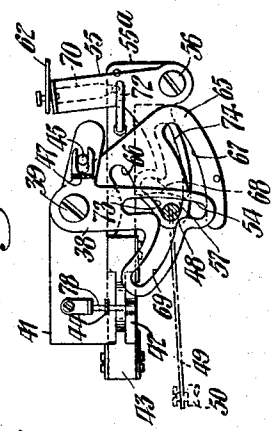


Fig. 11.

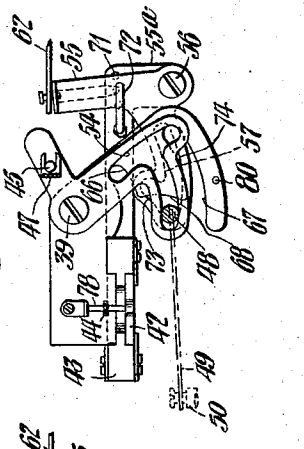


Fig. 7.

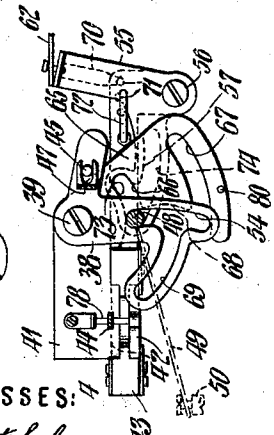
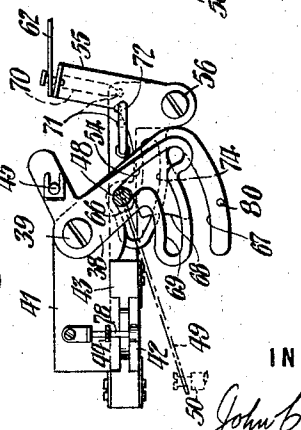


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN C. McLAUGHLIN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,211,467. Specification of Letters Patent. **Patented Jan. 9, 1917.**

Application filed April 30, 1915. Serial No. 24,844.

To all whom it may concern:

Be it known that I, JOHN C. McLAUGHLIN, a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to ribbon mechanism for typewriting machines in which a ribbon is vibrated over the printing point at each type stroke. The invention may be used with a ribbon having a plurality of color bands or stripes, which may be selectively brought into use; the ribbon mechanism being also settable at a stenciling or non-printing position so that the ribbon remains idle. The invention is designed for use with a machine in which the platen is shiftable to different case positions. Certain features of the invention, however, may be used with the mechanism adapted to a single color ribbon; and certain features of the invention may be used in a machine in which a non-shifting platen is employed.

The invention provides an improved arrangement of ribbon vibrating mechanism in which the ribbon vibrator and its actuating lever are supported by a frame or support separate from the platen shifting frame, and having a connection therewith to cause said support to shift up and down with the platen to different case positions, and thus maintain the ribbon vibrator in operative relation to the platen in both case positions. The actuating lever is carried on said support independently of the universal bar, and has a suitable operating connection with the latter, permitting said lever to shift up and down relatively to the universal bar, while maintaining its operative relation therewith.

To vary the throw of the ribbon vibrator and thereby bring different color bands into activity, a shiftable connection is provided between the actuating lever and the means by which motion is transmitted from said lever to the vibrator, the point of connection being shiftable toward and from the fulcrum of the lever.

A feature of the invention is the provision of positive means for preventing shifting of said point of connection during the operation of the vibrator, thereby insuring the accurate throw of the ribbon to the proper position over the printing point.

The invention further provides improved means for positively preventing operation of the vibrator when the mechanism is set at non-printing position, said means permitting the actuating lever to swing idly independently of the vibrator.

In practising the invention, an actuating lever for operating the ribbon vibrator, may be in the form of a bell crank mounted on a frame, shiftable up and down with the platen, said frame mounted on the machine frame and guided vertically thereby in its shifting movements. Said shifting frame may be shifted by a link connecting it to the carriage shift rail. The actuating lever may be mounted to swing about a vertical axis and connected through a link to a toggle comprising links connected at their outer ends respectively to the ribbon vibrator and said vertically shifting frame, whereby the horizontal vibration of the actuating lever is transmitted to the toggle and effects a vertical vibration of the ribbon vibrator. The actuating lever may be located beneath the universal bar and have a pin-and-slot connection therewith for transmitting motion from the universal bar to the lever, but permitting the lever to shift up and down with the platen independently of the universal bar.

The link for transmitting motion from the actuating lever to the toggle may be connected to said lever by a connecting pin shiftable in a radial slot in said lever to permit the point of connection to be shifted to and from the pivot of the lever, and thereby vary the throw of the ribbon to bring the desired color band into use. The shifting of said pin in the slot may be effected by a switch lever slotted to receive the pin and operated by the usual key or keys at the keyboard of the machine. Accidental shifting of the connecting pin in its slot during the operation of the actuating lever is positively prevented by a guide plate which may be fixed to said vertically shiftable frame, and is provided with arc-shaped slots to receive said pin, said slots concentric with the actuating lever fulcrum. Said guide plate further serves as a lock for the switch lever to prevent operation of the ribbon shift keys except when the ribbon is in non-print-

ing position. Said guide plate may also provide an intermediate stop surface to positively prevent the vibration of said pin by its lever when the ribbon shift keys are set to non-printing position. The actuating lever may be provided with an arc-shaped slot extending laterally from the radial slot and concentric with the lever fulcrum to permit the lever to swing idly when the mechanism is set for non-printing.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a sectional side elevation view of an Underwood typewriting machine with the present invention applied thereto, the parts being in their normal position of rest, the platen in lower case position, and the ribbon mechanism set for printing with the upper color band. Fig. 2 is a fragmentary front elevation view showing the platen in upper case position, the ribbon mechanism set for printing with the upper color band, and the ribbon thrown up to operative position over the printing line. Fig. 3 is a front perspective view showing the ribbon mechanism, the parts being in their normal position of rest, the platen in the lower case position, and the ribbon mechanism set for printing with the lower color band. Fig. 4 is a fragmentary front elevation view with the parts in the same position as in Fig. 3. Fig. 5 is a view similar to Fig. 4, but with the ribbon thrown up to operative position over the printing line. Fig. 6 is a perspective view of the vertically shiftable frame. Figs. 7 to 12 inclusive are part sectional plan views, each showing the actuating lever, the guide plate, and the switch lever by which the throw of the ribbon is controlled. Fig. 7 shows the parts set for printing with the upper color band. Fig. 8 shows the parts set at stenciling or non-printing position. Fig. 9 shows the parts set for printing with the lower color band. Figs. 10, 11 and 12 correspond to Figs. 7, 8 and 9 respectively, but show the position of the parts assumed when a type-bar has been thrown up to the printing point.

Types 15 on type-bars 16 are arranged to be swung upwardly and rearwardly about a fulcrum rod 17 to strike against the front face of the platen 18, by means of keys 19 connected through bell cranks 20 to the type-bars. The platen is mounted in a frame 21 to shift up and down to upper and lower case position in the carriage 22. The carriage is mounted to travel on a rear guide rail 23, and a front guide rail, not shown. A roll 24 on the platen frame runs on a shift rail 25 forming part of the platen shift frame 26, which swings on a horizontal axis 27, and may be operated by a shift key and lever 28, 29. The carriage may be driven by the usual spring motor, not shown, and its letter-feeding movement is controlled by an escapement mechanism comprising an escapement wheel 30, with which coöperate dogs 31 on a dog rocker 32 actuated by a universal bar 33. Shoulders 34 on the type-bars strike the universal bar at each type-stroke, and move it rearwardly to operate the dogs 31 and ribbon vibrating mechanism. A pinion 35 connected to drive the escapement wheel 30, runs in mesh with a rack 36 on the carriage.

The shoulders 34 on the type-bars are preferably formed to move the universal bar during a greater portion of the type-stroke than is necessary to operate the escapement mechanism, or than is usual in this type of machine. That is, there is sufficient lost motion between the universal bar and the escapement dogs to permit considerable movement of said bar and the ribbon vibrating mechanism, before said dogs are operated. The throw of the ribbon vibrator is thereby commenced at an early period in the type-stroke, thus aiding in positively positioning the ribbon over the printing point well in advance of the types.

Referring to Figs. 3 to 6, a ribbon vibrator or guide 37, through which the ribbon is guided and fed in the usual manner, is arranged to be vibrated vertically to a position over the printing line at each type-stroke. The rearward movement of the universal bar at each type-stroke is transmitted to an actuating lever or bell crank 38 fulcrumed by means of a pivot screw 39 on a stud 40, (Fig. 6) mounted on a vertically-shiftable frame 41. Said frame comprises vertical guide plates 42 guided on vertical standards 43, fixed to and forming part of the machine frame. The shiftable frame 41 is connected through an arm 44 to the platen shift rail 25, so that said frame is shifted up and down with the platen. The frame 41 is connected to the arm 44 by a horizontal pin 78 passing loosely through an aperture in said arm, which arrangement permits the frame 41 to be supported and guided vertically without any tilting movement while the platen shifting frame 26 swings about its fulcrum 27.

The connection between the actuating lever 38 and the universal bar comprises a pin 45 projecting vertically upward from the lever and entering a slot 46 in an arm 47 fixed to and offset downwardly from the universal bar frame. This connection permits the actuating lever to be shifted up and down with the platen, and leaves the universal bar entirely free from the weight of the ribbon vibrating mechanism.

The connections for transmitting motion from the actuating lever 38 to the ribbon vibrator comprise a vertical pin 48, connected to said lever, a link 49 connecting said pin with a pintle 50 and a link 51 from said pintle to the vibrator 37. The link 51

is connected to the vibrator through a pivot pin 52, which enters a vertical guiding slot in a guide 52ª on the type-bar segment, and serves to support and guide the vibrator in its vertical movement.

The pin 48 is preferably provided with collars 53 or other means, to secure it against movement up and down in the lever 38. To permit the pin 48 to be shifted toward and from the lever fulcrum and thereby vary the throw of the ribbon, said lever is provided with a radial slot 54, along which the pin 48 may be shifted by means of a shifting lever or switch 55, pivotally mounted on a stud 56 on a stationary bracket 56ª. The switch 55 is formed with a slot 57 into which the pin 48 extends, said slot formed to permit the pin 48 to work therein during the vibration of the lever 38 as more fully set forth hereinafter. The switch may be operated by keys 58 and 59, at the front of the machine, said keys fixed to a rock shaft 60 connected through a rock arm 61 and link 62 to the switch.

The ribbon comprises upper and lower color bands or zones 63 and 64, which are shown as black and red respectively. To bring the lower color band into use, the key 59 is depressed, as shown in Fig. 3, and the switch 55 thereby positioned to hold the connecting pin 48 at the outer end of the slot 54, so that the throw of the actuating lever 38 will produce sufficient movement of the connecting pin and the vibrator to throw the lower color band to an operative position over the printing line *a*. To bring the upper color band into use, the key 58 is depressed, whereby the switch 55 is thrown from the Fig. 9 to the Fig. 7 position, thus carrying the pin 48 to the inner end of the slot 54, and reducing the throw of the vibrator, so that the ribbon is lifted only a sufficient distance to bring the upper color band over the printing line *a* (Fig. 2) when the actuating lever 38 is operated at a type-stroke.

A guide plate 65, which may be fixed to the shifting frame 41, is provided with arc-shaped slots 66 and 67, concentric with the pivot 39 of the lever 38, in one or the other of which slots the pin 48 is guided during the vibration of the ribbon. When the red stripe is active, the pin 48 is in position to work in the slot 67, and is thereby positively prevented from moving along the slot 54 during the throw of the ribbon vibrator, so that the throw of the vibrator is positively controlled. When the upper color band is active, the pin 48 is guided in the inner slot 66, and its position in the lever slot 54 is thus positively controlled.

The ribbon shift keys may be set at an intermediate position in which the ribbon is silenced. The switch at this time, assumes the position shown in Figs. 8 and 11, in which the pin 48 is opposite a locking surface 68 on the guide plate 65, between the slots 66 and 67. The pin is thereby prevented from moving in a direction to throw the ribbon up. The actuating crank 38, however, is permitted to swing idly at this time, by means of an arc-shaped slot 69 concentric with the pivot 39 and positioned to receive the pin 48. The switch lever 55 is yieldingly held to each of the three positions mentioned, by means of a spring detent 70, carried on the switch, and having a boss at its free end to seat in openings or recesses 71. An arm 72, which overhangs the switch 55 and bears against the upper face thereof, offers a moderate resistance to the movement of said switch, and prevents its accidental displacement. The arm thus forms a friction brake which may be used in conjunction with the spring detent 70, although either said arm or detent might be used without the other.

The slot 57 in the switch comprises a section 73 which, when the switch is thrown to the right for printing with the upper color band, is concentric with the pivot 39 of the actuating lever and directly beneath the slot 66 in the guide plate to permit the pin 48 to swing from the Fig. 7 position to the Fig. 10 position. The section 74 of the slot 57 is concentric with the pivot 39 when the switch is thrown to the Fig. 9 position for printing with the lower color band. When the switch is at an intermediate position, (Figs. 8 and 11), the pin 48 is retained at the outer end of the slot in the switch.

A link 75 connects the pintle 50 and a pivot pin 76 secured to the frame 41, the link having a bearing sleeve 77 mounted on said pin 76. By reference to Figs. 4 and 5, it will be seen that the links 51 and 75 form a toggle between the frame 41 and the vibrator 37. The frame 41 being held stationary during the operation of the vibrating mechanism, the vibrator is thrown from the Fig. 4 position upward to the Fig. 5 position during the type stroke. It will be noted that this movement is most rapid at the commencement of the throw, owing to the position of the toggle links, and that said links approximate a straight line position at the completion of the throw, so that the final movement of the vibrator is comparatively slow and danger of overthrow is minimized or eliminated. The ribbon is also positioned over the printing line *a* at a comparatively early period during the type-stroke so that the positioning of the ribbon in advance of the type striking the platen is insured. The full throw of the vibrator is effected by a comparatively small movement of the actuating lever, as the vertical movement of the vibrator is

substantially double that of the link 75 at its point of connection with the link 49. Owing to the connection of the toggle link 75 with the shifting frame 41, and also owing to the fact that the actuating lever 38 is mounted on said shifting frame, it will be seen that the relative position of the toggle links remains unchanged as the frame 41 shifts up and down with the platen shift rail. The ribbon vibrator is consequently shifted up and down with the platen, and its position relative to the platen is the same for both case positions. The slot-and-pin connection between the actuating lever and the universal bar permits the actuating lever to shift with the platen without affecting the operative relation between said bar and lever. The pin 48 extends downwardly a sufficient distance to maintain its operative connection with the switch 55 when the platen is shifted upwardly. A stop pin 80 positively limits the throw of the switch 55.

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, the combination with a platen shiftable to upper and lower case positions, of a ribbon vibrator to vibrate a ribbon over the printing line on the platen, an actuator operated at each type stroke, a support on which said actuator is mounted, means to shift said support up and down with the platen, a toggle forming a connection between said support and the vibrator, and means coöperating with said toggle to form a driving connection between the actuator and vibrator and also to cause the vibrator to shift up and down with said support, and thus maintain a constant relation to the platen during the shifting of the latter.

2. In a typewriting machine, the combination with a platen shiftable to upper and lower case positions, of a ribbon vibrator, an actuator therefor, a support on which the actuator is mounted, means for shifting said support with the platen, a toggle forming a connection between said support and the vibrator, and means connecting the actuator with the toggle for operating the latter, and thereby actuating the vibrator, said connecting means between the toggle and said actuator serving to support the vibrator and cause it to shift up and down with the platen.

3. In a typewriting machine, the combination with a ribbon vibrator, of a pair of links forming a toggle, one end of which is connected to the vibrator, a support to which the other end of the toggle is connected, an actuating lever, a link connecting said lever to the toggle and operated by said lever in a direction transverse to the direction of movement of the vibrator, and means to actuate said lever.

4. In a typewriting machine, the combination with a vibrator mounted to move up and down at each type stroke, of a pair of links forming a toggle connected at one end to the vibrator, a support to which the other end of the toggle is connected at a point below the vibrator, a universal bar operated at each type stroke, a bell crank forming an actuator for the vibrator, and swinging transversely to the direction of movement of the vibrator, means to cause said bell crank to be operated by the universal bar, and a link connecting said bell crank with the toggle.

5. In a front-strike typewriting machine, the combination with a platen shiftable to upper and lower case positions, of a ribbon vibrator mounted to vibrate up and down in front of the platen to cover the printing point at each type stroke, a universal bar moved rearwardly at each type stroke, a supporting frame mounted for up and down movement on the machine frame, a pair of links forming a toggle, one end of which is connected to the vibrator and the other end of which is pivotally connected to said supporting frame at a point below the vibrator, an actuating bell crank mounted on said supporting frame and comprising an arm having a connection with the universal bar for operating the bell crank from said bar, a link connecting an arm of the bell crank with the toggle, a platen shift rail, and a connection between said rail and the supporting frame for shifting the latter up and down with the platen.

6. In a typewriting machine, the combination with a platen frame and a platen shift rail for shifting the platen frame to upper and lower case positions, a ribbon vibrator, an actuator therefor, a supporting frame on which said actuator is carried, a toggle connecting said supporting frame and vibrator and operated by said actuator to actuate the vibrator, said frame being supported and guided on standards on the machine frame, and a connection between the platen shift rail and said supporting frame for moving the latter up and down on said standards when the platen is shifted.

7. In a typewriting machine, the combination with a ribbon vibrator, of a toggle connected thereto, an actuating lever, a universal bar connected to vibrate said lever, means forming an operating connection from said lever to the toggle, and mechanism to shift the point of connection of said means and lever toward and from the fulcrum of the lever to vary the throw of the vibrator.

8. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever therefor, a universal bar connected to

vibrate said lever, means forming an operating connection from said lever to the ribbon vibrator, mechanism to shift the point of connection of said means and lever toward and from the fulcrum of the lever to vary the throw of the vibrator, and means to positively prevent the said point of connection shifting toward and from the fulcrum of the lever during the operation of the latter.

9. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever, a connector between said lever and vibrator, for transmitting the motion of said lever to the vibrator, a connecting pin by which said lever is attached to said connector, said pin shiftable toward and from the fulcrum of the actuating lever to vary the throw of the vibrator, and a stationary guide for said pin by which it is positively guided during the movement of the actuating lever and thereby prevented from shifting toward and from said fulcrum during the throw of the vibrator.

10. The combination with a ribbon vibrator, of an actuating lever therefor, intermediate mechanism for transmitting motion from the actuating lever to the vibrator, a connecting pin between said lever and said mechanism shiftable toward and from the fulcrum of the actuating lever, and a stationary guide plate having a slot therein in which said pin works during the throw of said lever to prevent said pin from shifting toward or from the fulcrum of said lever during the throw of the vibrator.

11. The combination with a vibrator for a bichrome ribbon, of an actuating lever, means forming a connection between said lever and the vibrator, said means comprising a pin and guiding means on said lever permitting the pin to be shifted toward and from the fulcrum of said lever to thereby vary the throw of the vibrator to bring different color bands into activity, and a guide plate having slots concentric with the fulcrum of said lever, in one or the other of which slots said pin is guided during the vibration of the lever to prevent the pin from moving toward or from said fulcrum.

12. The combination with a vibrator for a bichrome ribbon, of an actuating lever, means forming a connection between said lever and the vibrator, said means comprising a pin and guiding means on said lever permitting the pin to be shifted toward and from the fulcrum of said lever to thereby vary the throw of the vibrator to bring different color bands into activity, a guide plate having slots concentric with the fulcrum of said lever, in one or the other of which slots said pin is guided during the vibration of the lever to prevent the pin from moving toward or from said fulcrum, and a switch to shift said pin from position to cooperate with one slot into position to enter the other slot and thereby determine the throw of the ribbon vibrator.

13. The combination with a vibrator for a bichrome ribbon, of an actuating lever, means forming a connection between said lever and the vibrator, said means comprising a pin and guiding means on said lever permitting the pin to be shifted toward and from the fulcrum of said lever to thereby vary the throw of the vibrator to bring different color bands into activity, a guide plate having slots concentric with the fulcrum of said lever, in one or the other of which slots said pin is guided during the vibration of the lever to prevent the pin from moving toward or from said fulcrum, a switch to shift said pin from position to coöperate with one slot into position to enter the other slot and thereby determine the throw of the ribbon vibrator, a key or keys for actuating said switch, and means to yieldingly hold the switch in either of its shifted positions.

14. The combination with a ribbon vibrator, of an actuating lever, connecting means between said lever and the vibrator for transmitting motion to the latter, said connecting means comprising a pin and a radial slot in said lever along which the pin is shiftable, to vary the throw of the vibrator, and means for locking said pin in its shifted position along the slot to positively prevent it from shifting during the movement of the said lever and vibrator.

15. The combination with a ribbon vibrator, of an actuating lever, connecting means between said lever and the vibrator for transmitting motion to the latter, said connecting means comprising a pin and a radial slot in said lever along which the pin is shiftable, to vary the throw of the vibrator, means for locking said pin in its shifted position along the slot to positively prevent it from shifting during the movement of the said lever and vibrator, and a lateral slot extending from said radial slot and permitting said lever to be operated without transmitting motion to the vibrator, whereby the ribbon may be silenced.

16. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever therefor, a universal bar connected to operate said lever, and means to transmit motion from said lever to the vibrator to cause the vibrator to vibrate a ribbon over the printing point, said means comprising a pin, said lever having a slot along which said pin is shiftable to vary the effective length of the lever arm and thereby vary the throw of the ribbon vibrator to bring different color bands into activity, said lever having also a slot concentric with its fulcrum and uniting with said first-named slot at an intermediate point along the latter,

said arc-shaped slot holding said pin stationary in an intermediate position and permitting said lever to swing idly, whereby the ribbon is silenced.

17. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever therefor, a universal bar connected to operate said lever, means to transmit motion from said lever to the vibrator to cause the vibrator to vibrate a ribbon over the printing point, said means comprising a pin, said lever having a slot along which said pin is shiftable to vary the effective length of the lever arm and thereby vary the throw of the ribbon vibrator to bring different color bands into activity, said lever having also a slot concentric with its fulcrum and uniting with said first-named slot at an intermediate point along the latter, said arc-shaped slot holding said pin stationary in an intermediate position and permitting said lever to swing idly, whereby the ribbon is silenced, and a guide plate having slots in which said pin is guided when operated by said lever, said plate also providing an abutment or stop to positively prevent said pin from swinging with the lever when said pin is set to non-printing position, and thus positively preventing the ribbon vibrator from being thrown to position to carry the ribbon over the printing point.

18. In ribbon mechanism for a typewriting machine, the combination with a bipartite ribbon and a vibrator therefor, said vibrator having a variable throw to bring either of a plurality of color bands into activity, of an actuating lever, means operable at each type stroke to actuate said lever, means including a connecting pin on said lever to transmit motion of said lever to the vibrator, means to shift said connecting pin toward and from the fulcrum of the lever to vary the throw of the vibrator while the throw of said lever remains constant, and a guide in which said pin moves during the movement of the lever to prevent the pin from shifting toward or from the fulcrum of the lever.

19. In ribbon mechanism for a typewriting machine, the combination with a ribbon vibrator, of an actuating lever therefor, means to connect said lever with the actuator, to transmit motion from the lever to the actuator, said means comprising a pin, the lever comprising a guide along which the pin is shiftable toward and from the fulcrum of said lever to vary the effective length of the lever, and a switch lever for shifting the pin, the switch lever being formed with a guide along which the pin is guided as the pin moves with the actuating lever, said guide being concentric with the fulcrum of the actuating lever when the pin is in one operating position, to permit the actuating lever to swing, said switch lever having a second slot concentric with the fulcrum of the actuating lever when the switch is shifted to bring said pin to a different operating position.

20. In ribbon mechanism for a typewriting machine, the combination with a ribbon vibrator, of an actuating lever therefor, means to connect said lever with the actuator, to transmit motion from the lever to the actuator, said means comprising a pin, the lever comprising a guide along which the pin is shiftable toward and from the fulcrum of said lever to vary the effective length of the lever, a switch lever for shifting the pin, the switch lever being formed with a guide along which the pin is guided as the pin moves with the actuating lever, said guide concentric with the fulcrum of the actuating lever when the pin is in one operating position, to permit the actuating lever to swing, said switch lever having a second slot concentric with the fulcrum of the actuating lever when the switch is shifted to bring said pin to a different operating position, and a guide plate comprising slots in which said pin is guided and prevented from shifting toward or from the fulcrum of the actuating lever while the latter is in operation with said pin in either of said operating positions.

21. In a typewriting machine, the combination with a ribbon vibrator and a bichrome ribbon vibrated thereby, of an actuating lever for operating the vibrator, mechanism for operating said lever through substantially the same angle at each type stroke, means including a connecting pin on said lever to form an operating connection from said lever to the ribbon vibrator, mechanism to shift said pin toward and from the fulcrum of the lever, to vary the throw of the vibrator and thereby bring different color bands into use, and means whereby said pin may be held stationary and the lever rotated idly relatively to the pin, so that the ribbon vibrator is silenced.

22. In a typewriting machine, the combination with a universal bar operated at each type stroke, of a ribbon-vibrator, and a connecting train for transmitting motion from the universal bar to the vibrator, for operating the latter, said train comprising a lever and motion-transmitting means normally moving with the lever and having a slot-and-pin connection with the lever, said pin adjustable along the slot toward and from the fulcrum of the lever to thereby vary the throw of the vibrator, said lever having an arc-shaped slot concentric with its fulcrum along which said pin may move idly when the pin is adjusted to one position along the first-mentioned slot, to prevent motion from being transmitted from the universal bar to the vibrator and thereby silence the latter.

23. In a typewriting machine, the combi-

nation with a universal bar operated at each type stroke, of a ribbon vibrator, a connecting train from the universal bar to the vibrator to operate the latter, a bichrome ribbon moved by the vibrator to cover the printing point at each type stroke, said connecting train comprising a lever having a radial slot and a pin adjustable along said slot to vary the throw of the vibrator, said pin having positions of adjustment along the slot to bring either color band of the ribbon into activity, means to hold said pin in either position of adjustment along said slot, and an arc-shaped slot formed in said lever and branching from said radial slot at an intermediate point therealong to permit said pin when adjusted to an intermediate position along the radial slot, to be guided along the arc-shaped slot without transmitting motion from the universal bar to the vibrator, whereby the ribbon is silenced.

24. In a typewriting machine, the combination with a universal bar operated at each type stroke, of a ribbon vibrator, a connecting train from the universal bar to the vibrator to operate the latter, a bichrome ribbon moved by the vibrator to cover the printing point at each type stroke, said connecting train comprising a lever having a radial slot and a pin adjustable along said slot to vary the throw of the vibrator, said pin having positions of adjustment along the slot to bring either color band of the ribbon into activity, means to hold said pin in either position of adjustment along said slot, an arc-shaped slot formed in said lever and branching from said radial slot at an intermediate point therealong to permit said pin when adjusted to an intermediate position along the radial slot, to be guided along the arc-shaped slot without transmitting motion from the universal bar to the vibrator, whereby the ribbon is silenced, and key-controlled means to shift said pin into positions to selectively bring said ribbon bands into activity, or to said intermediate position in which the vibrator is silenced.

25. The combination with a vibrator for a bichrome ribbon, of an actuating lever, means forming a connection between said lever and vibrator, said means comprising a pin, guiding means on the lever permitting the pin to be shifted toward and from the fulcrum of the lever to thereby vary the throw of the vibrator to bring different color bands into activity, and a switch to shift said pin from position to render one color band active to position to render the other color band active, and means coöperating with said switch to hold the pin in either position of adjustment along said guiding means.

26. The combination with a ribbon vibrator, of an actuating lever therefor, means to transmit the motion of the lever to the vibrator, said means comprising a pin adjustable along a slot formed in the lever to thereby vary the effective length of the lever and correspondingly to vary the throw of the vibrator, and a switch lever formed with a slot into which said pin extends, said slot in the switch lever comprising a portion concentric with the fulcrum of the actuating lever when the switch is in one position of adjustment, and another portion also concentric with said fulcrum when the switch is in a different position of adjustment, said pin being guided in said slots in the switch lever and moving with the actuating lever when the latter is in operation.

27. The combination with a ribbon vibrator, of an actuating lever therefor, means to transmit the motion of the lever to the vibrator, said means comprising a pin adjustable along a slot formed in the lever to thereby vary the effective length of the lever and correspondingly to vary the throw of the vibrator, a switch lever formed with a slot into which said pin extends, said slot in the switch lever comprising a portion concentric with the fulcrum of the actuating lever when the switch is in one position of adjustment, and another portion also concentric with said fulcrum when the switch is in a different position of adjustment, said pin being guided in said slots in the switch lever and moving with the actuating lever when the latter is in operation, and a guide plate formed with guiding slots concentric with the fulcrum of the actuating lever and along which the said pin is guided during the movement of said actuating lever.

28. The combination with a ribbon vibrator and an actuating lever therefor, of means for transmitting the motion of said lever to the vibrator, said means comprising a pin adjustable along a slot formed in an arm of said lever to vary the effective length of the lever arm, a switch lever pivoted eccentrically of said actuating lever and formed with a slot into which said pin extends, whereby the movement of the switch lever about its fulcrum moves said pin toward or from the fulcrum of the actuating lever, and a guide along which said pin moves during the movement of the actuating lever and whereby said pin is positively prevented from shifting toward or from the fulcrum of the actuating lever as the latter operates, said pin also moving in the slot in said switch lever during the operation of the actuating lever, and locking the switch against movement except when the pin is beyond the control of said guide.

29. The combination with a bichrome ribbon and a vibrator therefor, of an actuating lever having a radial slot therein, a pin adjustable along said slot, means to transmit the motion of said lever and pin to the vibrator, means for adjusting said pin along

the slot to vary the throw of the vibrator and thereby bring either color band into use, and a guide plate formed with guiding means along which said pin is guided during the operation of the actuating lever while said pin is adjusted for either color band, said guide plate having a locking surface in the path of said pin when the latter is in an intermediate position of adjustment along said slot to positively prevent motion from being transmitted from the actuating lever to the vibrator.

30. In a typewriting machine, the combination with a ribbon vibrator, of a pair of links forming a toggle, a pin pivotally connecting the upper end of said toggle to the vibrator, a stationary guide provided with a vertical slot to receive said pin and by which the vibrator is vertically guided, and a support beneath the vibrator and to which the lower end of the toggle is connected.

31. In a typewriting machine, the combination with a ribbon vibrator, of a pair of links forming a toggle, a pin pivotally connecting the upper end of said toggle to the vibrator, a stationary guide provided with a vertical slot to receive said pin, and by which the vibrator is vertically guided, a support beneath the vibrator and to which the lower end of the toggle is connected; an actuating lever, a link connecting said lever to the toggle and operated by the lever in a direction transverse to the movement of the vibrator, and means to operate said lever.

32. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever, connecting means between said lever and vibrator for transmitting the motion of said lever to the vibrator, said means comprising a connecting pin shiftable on said lever toward and from the fulcrum of the lever to different positions of adjustment to thereby vary the throw of the vibrator, and guides for said pin stationary during the movement of said lever and by which said pin is positively guided during the movements of the lever while the pin is in either of said positions, whereby said pin is prevented from shifting toward or from said fulcrum during the throw of the vibrator.

33. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever, connecting means between said lever and vibrator for transmitting the motion of said lever to the vibrator, said means comprising a connecting pin shiftable on said lever toward and from the fulcrum of the lever to different positions of adjustment to thereby vary the throw of the vibrator, guides for said pin stationary during the movement of said lever and by which said pin is positively guided during the movements of the lever while the pin is in either of said positions, whereby said pin is prevented from shifting toward or from said fulcrum during the throw of the vibrator, and means to lock said pin in an inoperative position of adjustment and allow the lever to move independently of said pin, whereby the ribbon vibrator is silenced.

34. In a typewriting machine, the combination with a ribbon vibrator, of an actuating lever, connecting means for transmitting the motion of said lever to the vibrator, said connecting means including a connecting pin shiftable along said lever toward and from its fulcrum to vary the throw of the vibrator, and means to hold said pin stationary in one position and permit the lever to vibrate idly, whereby the ribbon vibrator is silenced.

35. The combination with a vibrator for a bichrome ribbon, of an actuating lever, means forming a connection between said lever and the vibrator, said means comprising a pin and guiding means on said lever permitting the pin to be shifted toward and from the fulcrum of said lever to thereby vary the throw of the vibrator to bring different color bands into activity, and guides concentric with the lever fulcrum by which the pin is prevented from moving toward or from said fulcrum during the operation of the lever.

36. In a front-strike typewriting machine, the combination with a platen, of a universal bar having a forward and rearward movement, a ribbon vibrator having up-and-down movement, a bell crank forming an actuator for the vibrator, said bell crank comprising an arm extending laterally from its pivot and connected to the universal bar at one side of said pivot, said bell crank comprising a forwardly and rearwardly extending arm to which a transverse movement is imparted by the universal bar, and means connecting said last-mentioned arm of the bell crank with the vibrator for actuating the vibrator.

37. In a front-strike typewriting machine, the combination with a platen, of a universal bar having a forward and rearward movement, a ribbon vibrator having up-and-down movement, a bell crank forming an actuator for the vibrator, said bell crank comprising an arm extending laterally from its pivot and connected to the universal bar at one side of said pivot, said bell crank comprising a forwardly and rearwardly extending arm to which a transverse movement is imparted by the universal bar, a toggle connected with the vibrator, the members of said toggle arranged to swing in an upright plane substantially parallel with the platen axis, and an operating link connecting the toggle with said last-mentioned arm of the bell crank for actuating the toggle and thereby moving the ribbon vibrator up and down.

38. In a typewriting machine, the combination with a universal bar; of a ribbon vi-

brator; a toggle; an operating connection to the toggle from the universal bar; a support for the toggle below the universal bar, one arm of the toggle being connected to the ribbon vibrator to actuate the latter, and another arm of the toggle being pivoted to the toggle support; a platen; means for shifting the toggle support in unison with the platen; a base for the toggle support in the frame of the machine; and means on said base to guide and hold the toggle support in the case-shifting operations.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."