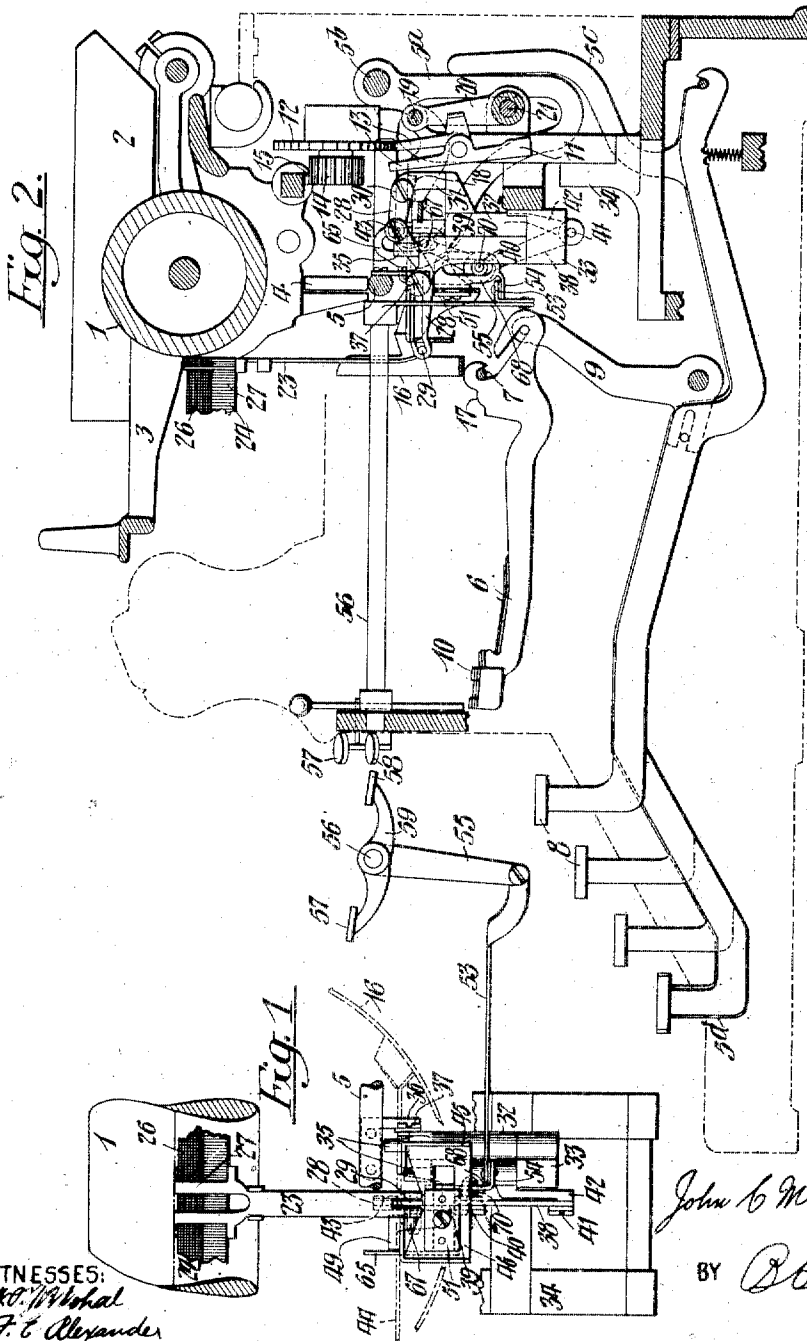


J. C. McLAUGHLIN.
TYPE WRITING MACHINE.
APPLICATION FILED MAY 14, 1915.

1,212,784.

Patented Jan. 16, 1917.

3 SHEETS—SHEET 1.



WITNESSES:
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F. C. Alexander

INVENTOR:

John C. McLaughlin

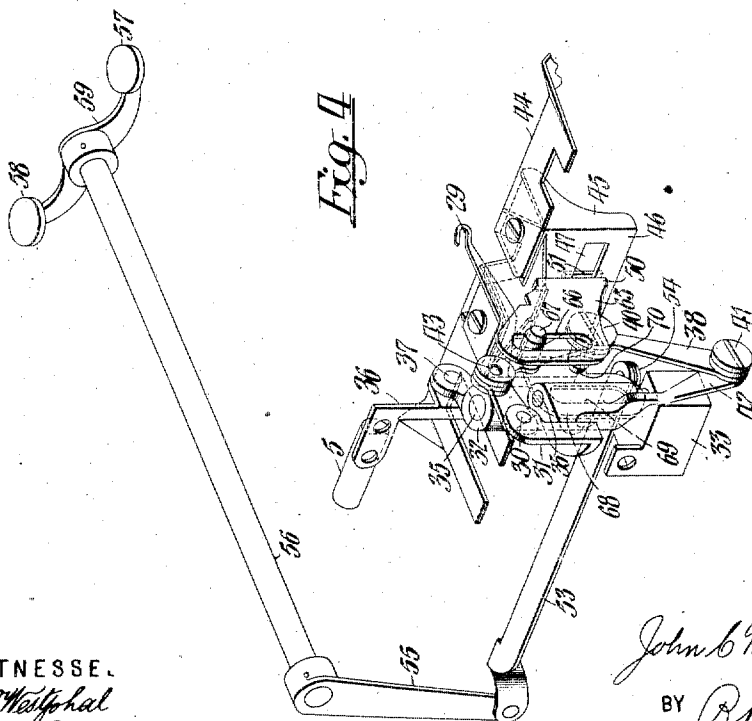
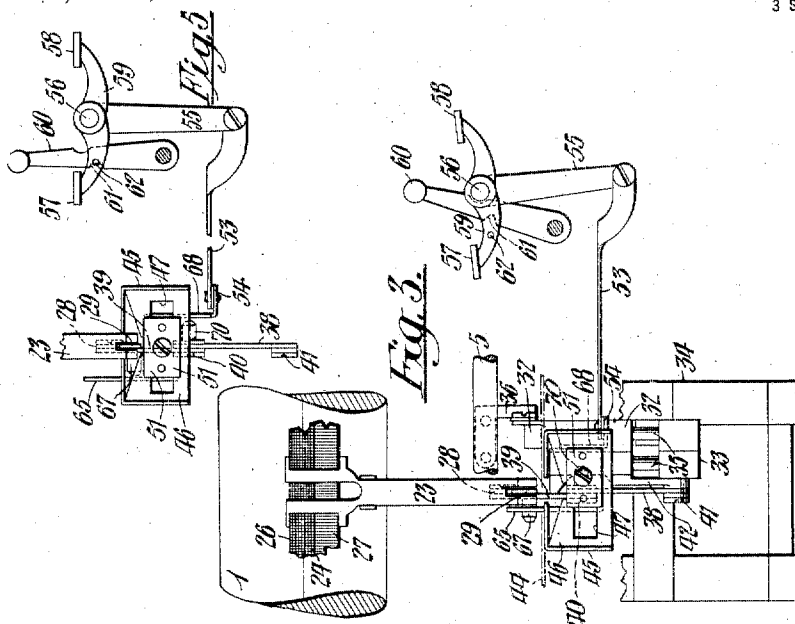
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3 SHEETS--SHEET 2.

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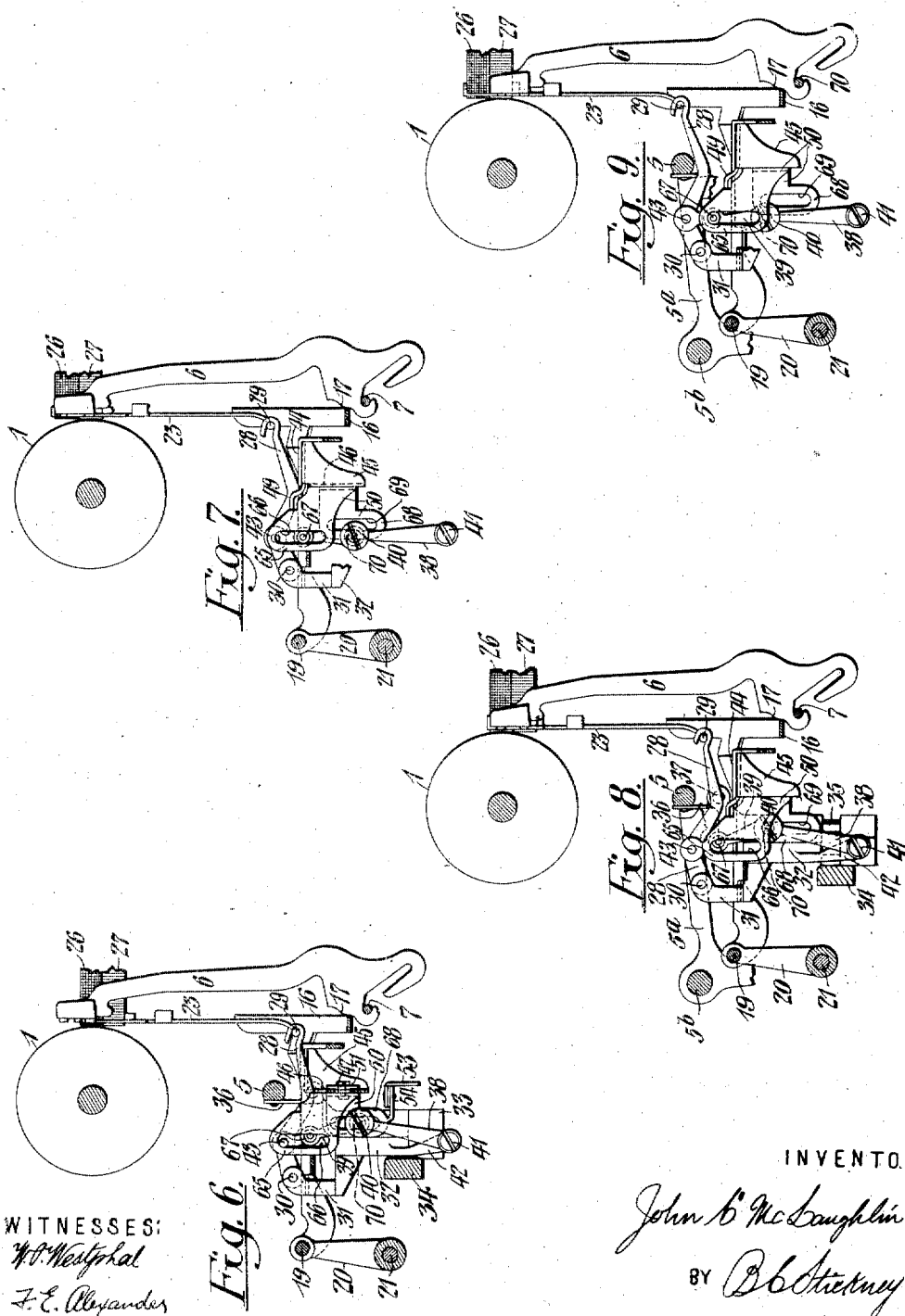
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

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

TYPE-WRITING MACHINE.

1,212,784.

Specification of Letters Patent.

Patented Jan. 16, 1917.

Application filed May 14, 1915. Serial No. 27,975.

To all whom it may concern:

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

The present invention relates to mechanism for vibrating the ribbon of a typewriting machine to cause it, at each type stroke, to cover the printing point at the platen, and after the type stroke, to return to a normal position in which the printing point is uncovered.

More particularly, the invention relates to ribbon vibrating mechanism adapted for use with a so-called bichrome or multi-color ribbon, that is to say, one which has distinct bands or zones of inks of different color arranged one beyond another. The use of a bichrome ribbon ordinarily involves the use, in connection with the ribbon vibrator, of means for giving it any one of a plurality of settings, so that the throw of the ribbon may be varied according to which of the color bands is selected.

One of the objects of the present invention is to provide a mechanism in which these settings are effected and changed with certainty, and by means of few and simple parts, of great durability.

Most typewriting machines have a case shift, the platen being ordinarily shiftable between upper and lower case positions. The ribbon vibrator must be accommodated to this shift.

An object of the present invention is a mechanism in which the vibrator is so constructed and mounted as to be shifted in unison with the platen without change in the relative position of the two, and with the movement of but few parts.

The invention has particular adaptability to a machine in which there is a case shift, because no change in position or operation of the setting mechanism referred to, or of the actuating means for the latter, is here involved in the case-shifting operation.

The invention is particularly designed for use in a machine of the kind in which the ribbon vibrator is actuated from a universal bar, which, in turn, is actuated by whatever type-bar is struck. Owing to the fact that

the type-bars ordinarily do not actuate the universal bar until they have moved well on their way to the platen, there is little time for the universal bar to throw the ribbon to the printing point. The movement of the vibrator must therefore be extremely rapid, and yet the momentum gathered by such rapidity of movement must not be allowed to overthrow the ribbon. These requirements are answered by employing a toggle as an actuator of the vibrator, intermediate the universal bar and the vibrator; the speed of drive of the vibrator being gradually decreased as the toggle straightens out, and the ribbon nears the printing point. Toggles for this purpose are not broadly new, but an important feature of the present invention resides in the form of toggle, here employed, in combination with a switch which coöperates therewith for connecting the universal bar to the toggle at any one of several different points by connecting members, such as pins, carried by the toggle; so that the throw of the latter may be varied as one or another of the color bands is selected. The switch itself is carried by the universal bar and moves forward and backward with the latter. In its preferred form, the switch comprises two ears, each slotted for engagement with a connecting pin on the toggle. The toggle, with its connecting pins at different points thereof, lies between the ears of the switch, out of engagement with either ear when stenciling is to be effected, but adapted to be actuated from the universal bar by one or the other of the switch ears after the switch has been shifted in one or another direction according to the color to be printed. To this extent the switch of the present invention is not broadly new.

It is an object of the present invention, however, to provide a modified construction of such a switch, whereby it may be more certain and reliable in its action than others, and to this end, it is mounted to be slid on a guideway on the universal bar, and is so supported on the bar as to be incapable of distortion or displacement.

A feature of this invention is the mounting of the toggle and arrangement of the latter with respect to the vibrator. The support or carrier for this toggle consists of a block which is shiftable between case posi-

tions on a rigid base. The block may be suspended from, and moved by, the ordinary platen shift rail, and in all positions may be guided by, and held to, the base by means of pin-and-sleeve connections between the two. Since the block is preferably suspended substantially under the shift rail, it is at practically the same radial distance as the latter from the pivot around which the rail swings in the case-shifting operation, and consequently, when shifted, maintains its relative position to the platen.

Other features and advantages will hereinafter appear.

15 In the accompanying drawings, Figure 1 is a fragmentary view, in front elevation, of the ribbon vibrating and setting mechanism, shown in conjunction with the platen, the parts being set for lower case position with the black ribbon band operative. Fig. 2 is a sectional side elevation of the machine, the parts being in the same position as in Fig. 1. Fig. 3 is a view similar to that of Fig. 1 except that the parts are set for upper case position with the red ribbon band operative. Fig. 4 is a view in perspective of the ribbon vibrating and setting mechanism shown in Figs. 1, 2 and 3. Fig. 5 is a view in front elevation of the ribbon setting mechanism locked in neutral or non-printing position for stenciling. Fig. 6 is a view in side sectional elevation showing the mechanism, in conjunction with the platen and a type bar, in the position assumed in printing black in lower case. Fig. 7 is a view similar to that of Fig. 5, except that the setting of the parts is such that red is being printed in lower case. Fig. 8 is a view similar to Figs. 6 and 7, with the parts set to print black in upper case. Fig. 9 is a view similar to Figs. 6, 7 and 8, with the parts set to print red in upper case.

Referring to the drawings, and more particularly to Fig. 2, the platen 1 is shown as journaled in platen frame 2, mounted on the carriage 3 and shiftable up and down thereon to bring the platen to upper and lower case positions. A roller 4 on the platen frame runs on a shift rail 5, carried on a frame 5^a, adapted to be swung up around a pivot 5^b, by shift key levers 5^c, operated by the usual shift keys. The type bars 6, fulcrumed on a rod 7, are actuated by keys 8 connected to the type bars through bell cranks 9, so that depression of a key 8 throws the connected type bar upward and rearward to cause a type 10 to strike against the front face of the platen.

The carriage may be driven by the usual spring drum, (not shown); and the letter-feed movement of the carriage is controlled by escapement mechanism comprising a dog-rocker 11, and an escapement wheel 12, which dogs 13, on the rocker, engage. A pinion 14, connected to drive the escapement

wheel 12 during the letter-feed travel of the carriage, runs in mesh with a rack 15 on the carriage. A universal bar 16 lies in the path of shoulders 17 on the type bars 6, and, at each type stroke, a shoulder 17 strikes the universal bar as the type approaches the printing point and moves the universal bar rearward, thereby causing a rearward extension 18 of the universal bar to strike and operate the dog rocker 11. At the rear of the universal bar, the ends thereof are pivotally connected, as at 19, to arms 20 which swing on a rod 21, mounted in the frame, thus supporting and guiding the bar in its movements. Forward, the bar is also supported by, and slides on, the type segment (not shown). The bar therefore moves easily and with the same movement for all type strokes. It cannot be twisted or distorted by the strokes of outlying type adjacent its ends; and, in actuating the escapement mechanism, and the ribbon vibrating mechanism, as hereinafter to be described, its movements are reliable and uniform for all type bars.

The ribbon vibrating mechanism, (see more particularly Fig. 4) comprises a ribbon vibrator and guide 23 through which the ribbon 24 is threaded, and by which it is vibrated over the printing point at each type stroke. The ribbon preferably comprises a plurality of color bands or zones for printing in different colors, and as shown comprises an upper black band 26, and a lower red band 27. The vibrator is actuated by a vibrator lever 28 to which it has a hook and pin connection 29. The lever 28 is pivoted at 30 to an ear 31 which protrudes upward from a block 32. The block 32 for supporting the vibrator lever is shown as mounted on a base piece 33 carried by the frame 34 on which the escapement dog rocker 11 is supported.

Pins 35, (see Figs. 3 and 8) fast in the base piece 33, fit into corresponding passages in the block 32 and serve as ways on which the block 32 may be moved up and down with the platen between upper and lower case positions. To effect this up and down movement of block 32, there is attached to the shift rail 5 (see Figs. 3 and 4) a bracket arm 36, the lower end of which is attached at 37 to the block 32. Consequently the relative position of the platen and the block 32, to which the vibrator lever is pivoted, remains always the same, and the ribbon vibrator is thus maintained in operative relation to the platen.

The vibrator lever is actuated at each type stroke, that is to say, whenever the ribbon is to be used. In stenciling, since the ribbon is not desired, the vibrator is silenced in a manner presently to be described. The vibrator when in use is set to present either the black or the red band to the printing

point. To so present the red, or lower band, necessitates a larger throw of the vibrator than is required when the black or upper band is used. Consequently provision is made for two settings of the vibrator actuator. This actuator consists of a toggle having two links or arms 38 and 39, pivotally connected at 40. The lower arm 38 is pivoted at 41 to an ear 42 on the block 32. The toggle therefore moves with the block 32 between case positions. The upper arm 39 of the toggle is pivoted at 43 to the vibrator lever 28. Whenever, therefore, the toggle is operated, the lever 28, and with it, the vibrator, is actuated. Upon the extent of movement of the toggle, depends the throw of the ribbon.

The operation of the toggle is effected from the universal bar by the following means. Forming part of the universal bar is a plate 44, to the under side of which is attached a bracket 45 having a vertical plate 46, slotted longitudinally thereof at 47. Supported against the rear face of the bracket plate 46 is a switch member 50. Secured to the switch 50 by means of pins passing through the slot 47 is a small plate 51 for holding the switch in true position against the bracket 45. Slot 47 permits movement of the switch, with its retaining plate, along the face of the bracket. A guide or guard in the form of a strip 49, preferably struck out of or integral with the bracket 45 and extending closely over or against the switch 50, may be employed to steady and hold the latter against angular or vertical displacement. The switch is set to the left (as shown in Fig. 1) or to the right (as shown in Fig. 3), or in central position (as shown in Fig. 5) according to whether the ribbon is to print black, or red, or is to be silent. For setting the switch in any desired one of these three positions, there is provided a rod or bar 53, attached at one end to an ear 54, on the switch, and at the other end to an arm 55 on a rock shaft 56. Shaft 56 extends to the front of the machine and carries two keys 57 and 58 mounted, one on each side thereof, by means of arms 59 fast to the shaft. Depression of key 57 throws the switch to Fig. 3 position; and depression of key 58, to Fig. 1 position. If the keys are thrown to the intermediate position shown in Fig. 5, then, as above stated, the ribbon will not vibrate. To maintain with certainty the Fig. 5, or stenciling position, a lock in the form of a finger lever 60, pivoted to the frame, and having a notch 61 to engage a pin 62 on one of the arms 59, is employed. Normally this lock is in the Fig. 3 position.

It has been stated that the switch 50 is so mounted on the universal bar as to move backward and forward with the latter on every operation of a type key. This back-

ward and forward movement is transmitted to the vibrator lever 28 as follows. Switch 50 in addition to the part thereof which rests against the bracket plate 46, has on each end a slotted ear. On the right of the switch (see Fig. 4) is an upstanding ear 65 with a vertical slot 66 therein. This slot 66, when the key 57 is depressed, engages a pin or wrist 67 carried by the toggle arm 39 at an intermediate point of the latter. If, during such engagement, a type bar is depressed, the toggle is actuated, and with it, the vibrator lever 28 and ribbon vibrator 23. The position of pin 67 is such that the movement of the vibrator is sufficient to straighten out the toggle, thereby giving it its maximum movement to present the red band to the printing point.

On the left of the switch 50 is a downturned ear 68 having also a vertical slot 69 therein. When key 58 is depressed, the switch is shifted to withdraw the pin 67 from the slot in the ear 65, and to cause the slot 69 in ear 68 to engage a pin or wrist 70, shown as mounted at the pivotal point of the two arms of the toggle. The position of pin 70 is to the rear of pin 67, and as each slot is normally aligned with its co-operating pin, and the movement of the universal bar is always the same, the toggle will not, in this instance, be given its maximum movement by the universal bar, but will, upon operation of a type bar, be brought to Fig. 6 position; this movement, however, being sufficient to bring the black band to the printing point.

It will be understood that the two ears 65 and 68 of the switch are spaced a sufficient distance apart to permit of the neutral or stenciling position shown in Fig. 5, in which neither ear is in engagement with its toggle pin. When in such position, the switch simply moves backward and forward with the universal bar without effecting any movement of the toggle or vibrator. The weight of the vibrator normally holds the ribbon away from the printing point, and moves it away after each vibration.

It will also be apparent that the setting and operation of the vibrator as just described, is not affected by the case-position of the platen, since, as already shown, the block 32, together with the toggle and vibrator lever 28 mounted thereon, are shifted as a unit with the platen. The switch 50, however, is fast to the universal bar, so far as vertical movement is concerned, and does not shift with the platen. To accommodate the switch to the shift of the block 32, the slots 66 and 69 in the ears of the switch are of such length that in either case-position, ample play is allowed for the toggle pins. In lower case position, as will be observed on reference to Figs. 6 and 7, the toggle pins, when the ribbon is at printing point, are at

about the center of the slots, whereas in upper case position at this time, the pins are near the top of the slots.

It is to be noted from the foregoing that the toggle support is so firmly connected to the base, and is of such a substantial character, that it cannot be deflected or forced out of its true position with respect to the platen; also that by reason of its preferred position below the shift rail and of its connection to the latter, it moves easily with the platen from one case position to the other, without liability of jamming and without relative change of position between it and the platen. It will also be noted that by reason of the connection of the switch direct to the toggle, the number of levers and actuating parts are reduced to a minimum. The large sliding bearing of the switch on the universal bar prevents distortion or displacement of the switch, and thus assures proper engagement of the latter with the toggle pins whenever the switch is shifted.

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 universal bar; of a ribbon vibrator; a toggle; a toggle support; 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; and means forming a direct connection from a point of said toggle, intermediate said support and said vibrator-connection, to the universal bar, by which the motion of the bar is transmitted without change in direction to the toggle.

2. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle; a toggle support; 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; and means whereby the toggle may be directly connected at different points thereof, intermediate said support and said vibrator-connection, to the universal bar, for transmitting the motion of the bar to the toggle.

3. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle; a toggle support; 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 switch connected to the universal bar; connecting devices for connecting the switch directly to the toggle at different points of the toggle, whereby the motion of the universal bar may be transmitted to the toggle; and a guideway on which the

switch is movable from one to another of said connecting devices.

4. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle; a toggle support; 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 slotted bracket carried by the universal bar; a switch mounted to slide in said slot; connecting devices for connecting the switch directly to the toggle at different points of the toggle, whereby the motion of the universal bar may be transmitted to the toggle; and means for sliding the switch in said slot from one to another of the connecting devices.

5. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle; a toggle support; 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 slotted bracket carried by the universal bar; a switch mounted to slide in said slot; connecting devices for connecting the switch directly to the toggle at different points of the toggle, whereby the motion of the universal bar may be transmitted to the toggle; and key-controlled connections for sliding the switch in said slot between the positions at which it is connected to the toggle.

6. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle; a toggle support; 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 slotted bracket carried by the universal bar; a switch mounted to slide in said slot; connecting devices for connecting the switch directly to the toggle at different points of the toggle, whereby the motion of the universal bar may be transmitted to the toggle; and key-controlled connections for sliding the switch in said slot between the positions at which it is connected to the toggle, said connections comprising a rock shaft having a key mounted thereon at each side thereof, operation of one of said keys effecting movement of the switch in one direction, and operation of the other of said keys effecting movement of the switch in the other direction.

7. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; actuating mechanism for said vibrator comprising a lever connected thereto and a toggle connected to said lever; a switch carried by the universal bar; connecting devices for connecting the switch to the toggle at different points of the toggle; and a guideway on which the switch

is movable from one to another of said connecting devices to vary the throw of the vibrator.

8. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; actuating mechanism for said vibrator comprising a lever connected thereto and a toggle connected to said lever; a slotted bracket fast to the universal bar; a switch movable in said slot; connecting devices for connecting the switch to the toggle at different points of the toggle; and means for shifting the switch to one or another of said connecting devices to vary the throw of the vibrator.

9. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; an actuating mechanism for said vibrator comprising a toggle; a switch carried by the universal bar; connecting pins at different points on the toggle; and a guideway on which the switch is movable from one to another of said connecting pins to vary the throw of the vibrator.

10. In a typewriting machine, the combination with a universal bar arranged for forward and rearward movement; of a ribbon vibrator; actuating mechanism for said vibrator comprising a toggle having its members arranged to swing in a plane parallel with the direction of movement of the universal bar; a slotted bracket fast to the universal bar; a switch mounted for horizontal movement in said slot transverse to the direction of movement of said bar; connecting pins at different points on said toggle; and means for shifting the switch from one to another of said connecting pins to vary the throw of the vibrator.

11. In a typewriting machine, the combination with a universal bar; of a ribbon vibrator; a toggle arranged to actuate said vibrator, said toggle and vibrator shiftable relatively to the universal bar to different case positions; a switch carried by the universal bar; connecting members for connecting the switch to different parts of the toggle; and means by which the switch and toggle are moved relatively to bring the switch into connection with one or another of said connecting members to vary the throw of the vibrator.

12. In a typewriting machine, the combination of type keys; a ribbon vibrator; means for transmitting motion to the vibrator from the type keys, said transmitting means comprising a toggle, and a switch, and a guideway on which the switch is mounted to be shifted along the guideway into a plurality of operating relations to said toggle to vary the throw of the vibrator.

13. In a typewriting machine; a platen; means for shifting the platen between case positions; a ribbon vibrator; an actuating

lever for said vibrator; a toggle connected to operate said lever; a block on which said lever and toggle are supported; means for shifting the block in conjunction with the platen; a base for the block; and pin and sleeve connections between the base and the block, whereby the block is held and guided when the case position of the platen is changed.

14. In a typewriting machine; a platen; means for shifting the platen between case positions; a ribbon vibrator; an actuating lever for said vibrator; a toggle connected to operate said lever; a block on which said lever and toggle are supported; means for shifting the block in conjunction with the platen; a base for the block; and pins fast in the base which project into the block and serve as guides for the block in the case-shifting operation.

15. In a typewriting machine; a platen frame; a member by which the platen frame is engaged and lifted; a ribbon vibrator; an actuating lever for said vibrator; a toggle connected to operate said lever; a support on which said lever is pivoted and on which the toggle is mounted; means by which said support is suspended from and below the member by which the platen frame is lifted, so that said member and the support may move together, in substantially the same plane, between case positions; and a device to operate said toggle and having a sliding connection therewith permitting the case-shifting movements of the toggle while holding the toggle in operative position.

16. In a typewriting machine, the combination with a universal bar; of a bichrome ribbon vibrator; actuating mechanism for said vibrator comprising a lever connected thereto; a toggle, one arm of which is in engagement with said lever to actuate the same; a support to which the other arm of said toggle is pivoted; a switch mounted in a guideway in the universal bar to move with the latter and to have also a transverse movement in the guideway; two ears spaced apart on said switch; and connecting members at different points on said toggle, adapted, one or the other to interlock with a corresponding one of said ears, according to the position of the switch, whereby the throw of the vibrator lever may be varied to present different ribbon colors to the printing point.

17. In a typewriting machine, the combination with a universal bar; of a bichrome ribbon vibrator; actuating mechanism for said vibrator comprising a lever connected thereto; a toggle, one arm of which is in engagement with said lever to actuate the same; a support to which the other arm of said toggle is pivoted; a switch mounted in a guideway in the universal bar to move

with the latter and to have also a transverse movement in the guideway; two ears spaced apart on said switch; and connecting pins at different points on said toggle, adapted, one or the other to interlock with a corresponding one of said ears, according to the position of the switch, whereby the throw of the vibrator lever may be varied to present different ribbon colors to the printing point, said ears being sufficiently spaced apart to provide for a position of the switch in which neither of said ears engages a toggle connecting pin, so that when in such position, the universal bar may move without vibration of the ribbon.

18. In a typewriting machine, the combination of type keys; a ribbon vibrator; means for actuating the vibrator from the type keys, said actuating means comprising a switch having parallel ears; and a connection to the vibrator including a toggle having connecting pins at different points thereof, each of which pins, according to the position of the switch, is adapted to engage a cooperating one of said ears.

19. In a typewriting machine, the combination of type keys; a universal bar actuated by each of said keys; a ribbon vibrator; means for actuating the vibrator from the universal bar, said actuating means comprising a switch having parallel ears mounted to be shifted between clutch positions on the universal bar; and a connection to the vibrator including a toggle having connecting pins at different points thereof, each of which pins, according to the position of the switch, is adapted to engage a cooperating one of said ears.

20. In a typewriting machine, the combination of a ribbon vibrator, a toggle connected to operate the vibrator, an actuator for the toggle, and means whereby the actuator may be directly connected with the toggle at any one of a plurality of different points on the toggle to thereby vary the throw of the vibrator.

21. In a typewriting machine, the combination of a ribbon vibrator, a toggle connected to operate the vibrator, an actuator for the toggle, and means for effecting a relative shifting of said actuator and toggle to connect the actuator with the toggle at any one of a number of different points whereby the throw of the vibrator may be varied.

22. In a typewriting machine, the combination of a ribbon vibrator, a toggle connected to operate the vibrator, an actuator for the toggle, a plurality of connecting pins at different points on the toggle, and means for effecting a relative shifting of said actuator and toggle to connect the actuator with either one of said pins whereby the throw of the vibrator may be varied.

23. In a typewriting machine, the combination with a ribbon vibrator, of a toggle

connected to operate the vibrator, said vibrator and toggle shiftable together to upper and lower case positions, an actuator for the toggle, and connecting pins at different points on the toggle, said actuator having guideways for said pins, the actuator and toggle being relatively shiftable to bring either pin to a guideway to thereby effect an operating connection between the actuator and the toggle, said guideways permitting the toggle to shift to different case positions while the actuator remains at rest and maintains its operating connection with the toggle.

24. In a typewriting machine, the combination of a ribbon vibrator arranged to vibrate up and down, a lever connected to actuate the vibrator, a toggle connected to the lever to move it up and down at its point of connection therewith, a universal bar having a forward and rearward movement, and means to transmit the motion of said bar to the toggle directly and without change in direction.

25. In a front-strike typewriting machine, the combination with a platen and a ribbon vibrator in front of the platen, of a lever extending forward from its pivot and connected at its forward end to the vibrator, a toggle connected to said lever, a universal bar having a forward and rearward movement, and a connecting device between the universal bar and the toggle for imparting a forward and rearward movement to the toggle at the point of connection with said device and causing the toggle to move the said lever up and down at its point of connection with the toggle and thereby move the vibrator up and down in front of the platen.

26. In a typewriting machine, the combination with a ribbon vibrator, of a toggle connected to actuate the vibrator, an actuator for said toggle, and means for connecting said actuator to the toggle either at the pivot connecting the toggle arms or at an intermediate point on one of said arms, whereby the throw of the vibrator may be varied.

27. In a typewriting machine, the combination of a ribbon vibrator, a lever connected to actuate the vibrator, a support on which said lever is mounted, a toggle for operating said lever, comprising a link pivoted on said support and extending upwardly from its pivot, and a second link pivoted at the upper end of the first-mentioned link and extending upwardly therefrom and connected at its upper end to said lever, a universal bar, a switch mounted on said bar and comprising wings projecting on opposite sides of the toggle, connecting pins projecting from opposite sides of the toggle, said wings having guideways to receive said pins, means

to shift said switch laterally on the universal bar to bring either connecting pin into operative engagement with the switch, whereby the universal bar may operate the toggle and vibrator, and means to shift said support, and with it the toggle, lever and vibrator, up and down to different case posi-

tions, said guideways permitting said shifting while the switch remains at rest and in operative connection with the toggle.

JOHN C. McLAUGHLIN.

Witnesses:

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F. E. ALEXANDER.