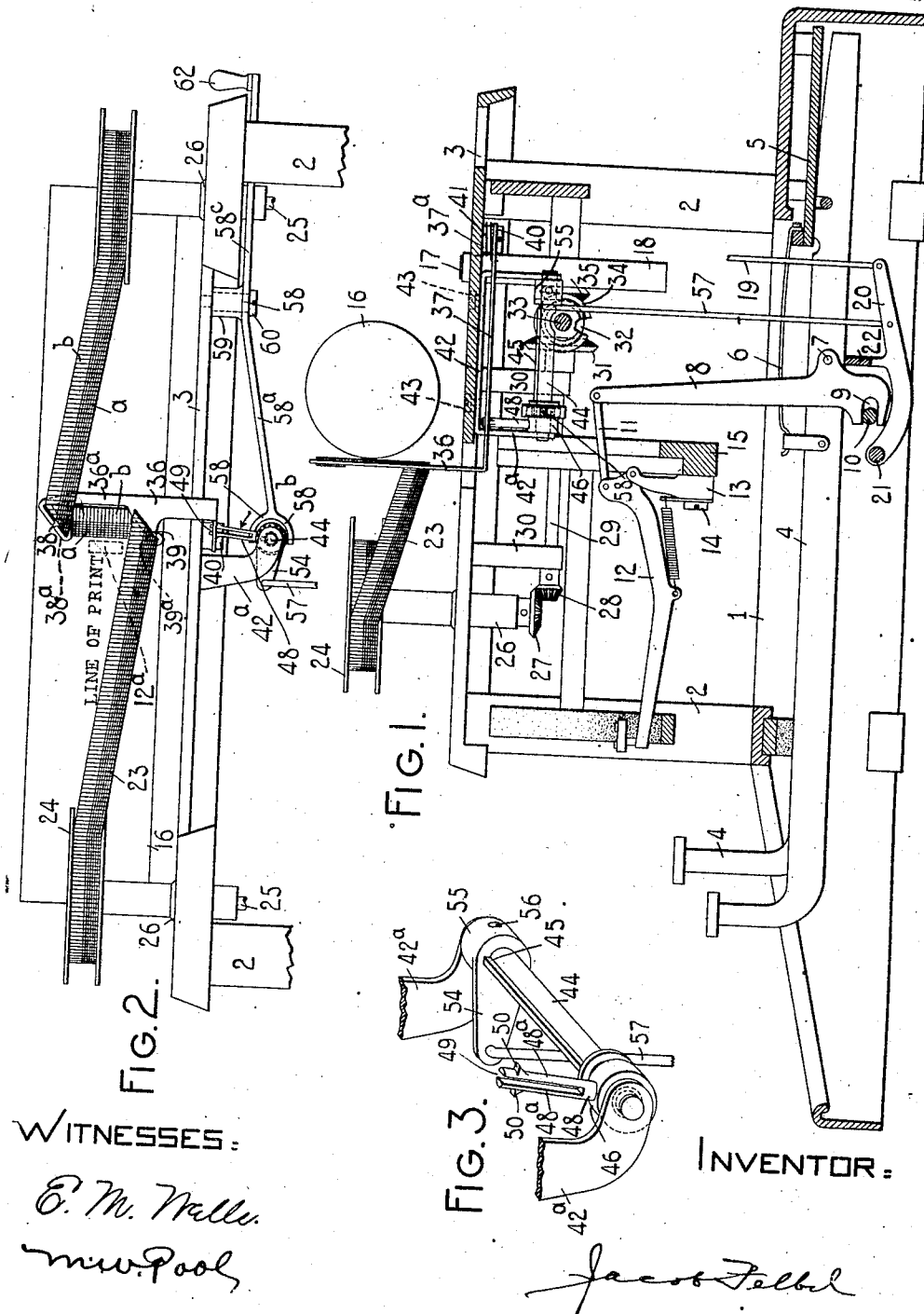


938,562.

J. FELBEL.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 24, 1907.

Patented Nov. 2, 1909.
3 SHEETS—SHEET 1.



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Patented Nov. 2, 1909.
 3 SHEETS—SHEET 2.

FIG. 4.

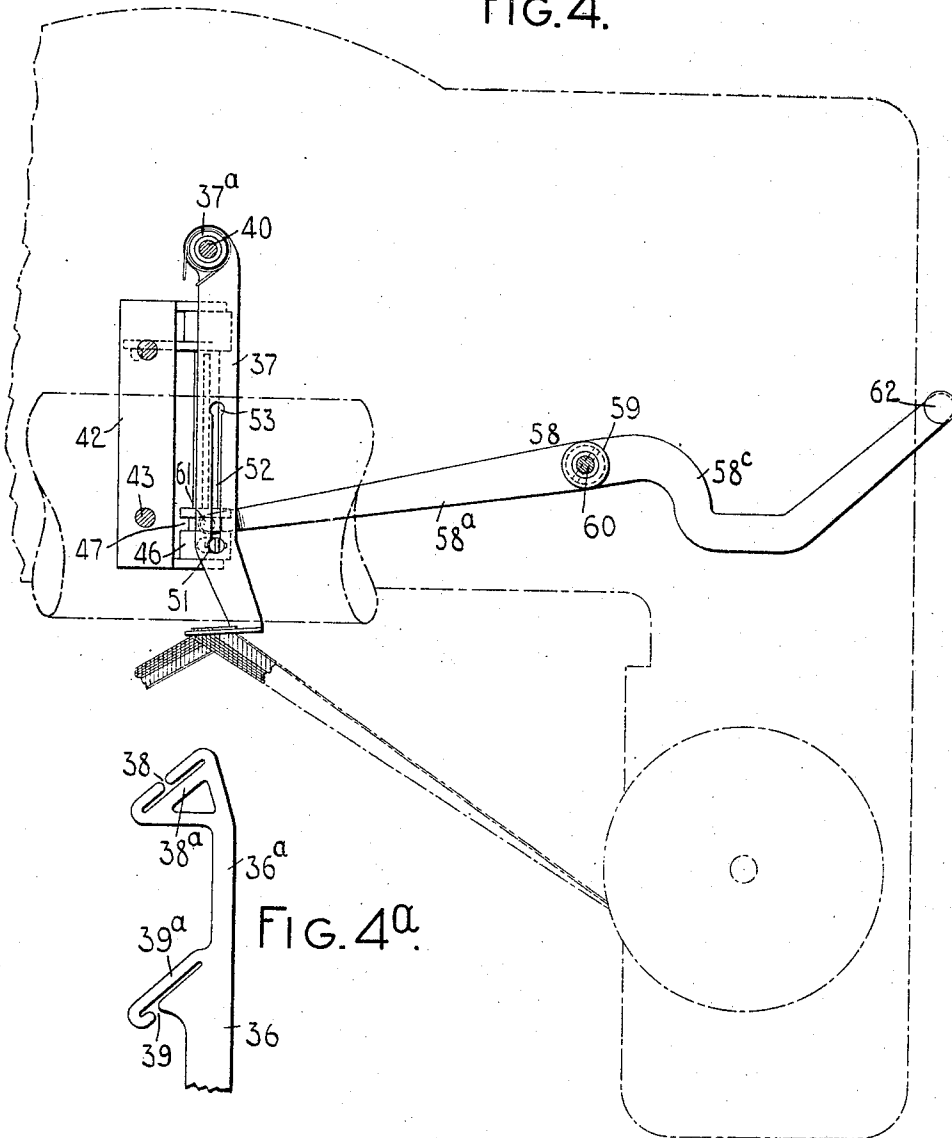


FIG. 4^a.

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3 SHEETS—SHEET 3.

FIG. 5.

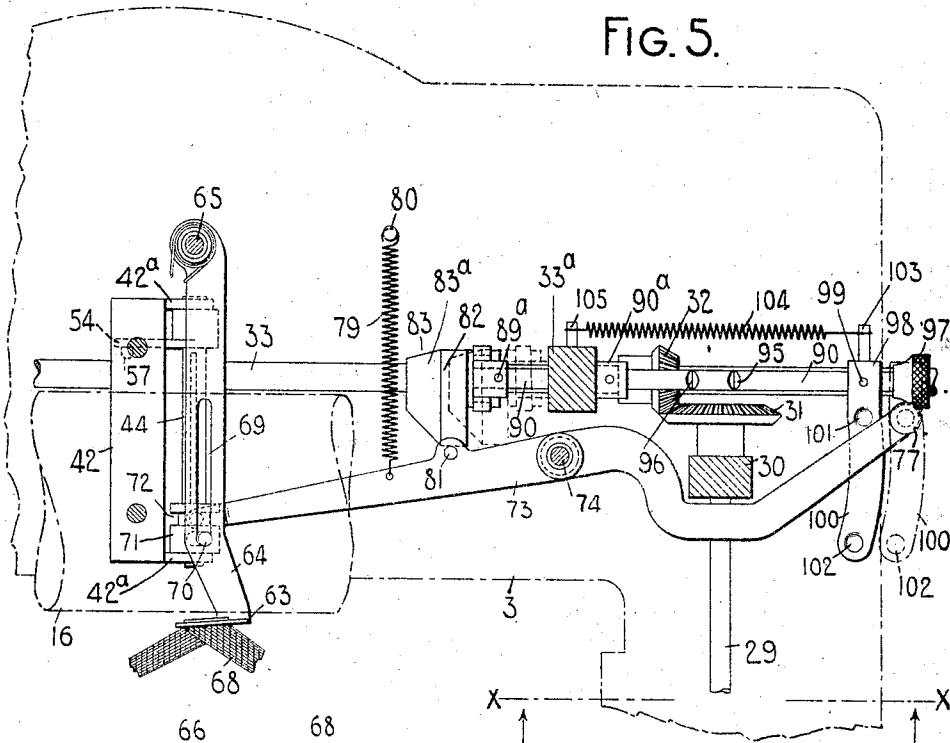
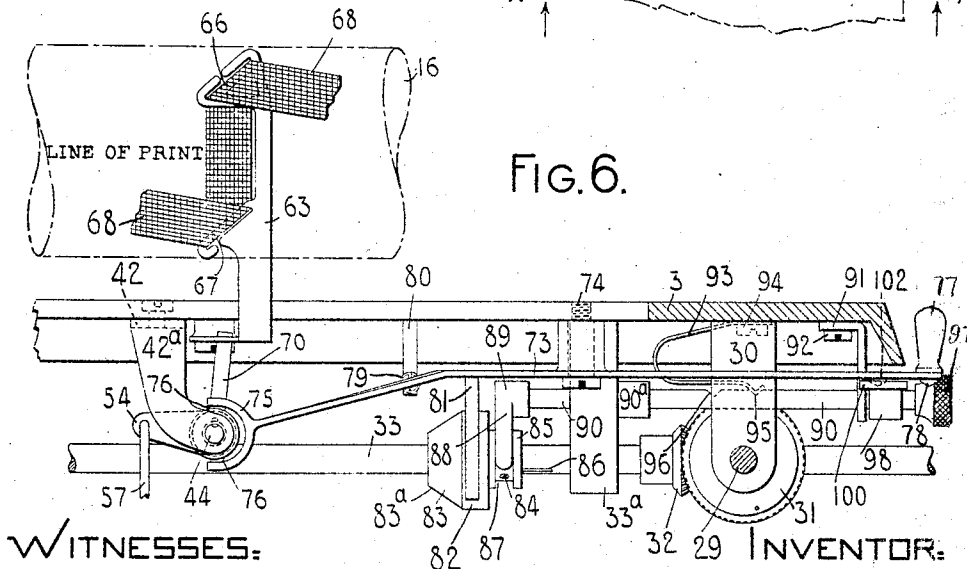


FIG. 6.



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UNITED STATES PATENT OFFICE.

JACOB FELBEL, OF NEW-YORK, N. Y., ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

938,562.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed September 24, 1907. Serial No. 394,348.

To all whom it may concern:

Be it known that I, JACOB FELBEL, citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to ribbon mechanisms for typewriting machines and has for its object to provide improved devices of the class specified.

To these and other ends my invention consists in the features of construction, combinations of devices and arrangements of parts hereinafter described and particularly pointed out in the appended claims.

I have shown my invention as applied to a Monarch typewriter but the nature of the invention is such that it may be readily adapted to other styles of writing machines.

Two forms of the invention are illustrated in the accompanying drawings wherein—

Figure 1 is a vertical front to rear sectional view taken about centrally of a typewriting machine showing my invention embodied therein, parts of the machine being omitted. Fig. 2 is a fragmentary front elevation of the upper part of the machine, parts being omitted. Fig. 3 is a perspective view showing certain of the parts of my invention. Fig. 4 is a horizontal sectional view taken on a plane beneath the top plate of the machine and showing certain features of my invention and allied parts. The top plate, platen, right-hand ribbon spool and part of the ribbon are shown in dotted lines, being above the plane on which the section is taken. Fig. 4^a is an enlarged front view of the upright portion of the ribbon vibrator. Fig. 5 is a view corresponding to Fig. 4 but showing a further development of my invention. Fig. 6 is a transverse vertical sectional view taken on the plane represented by the dotted line $x-x$ of Fig. 5 and looking in the direction of the arrows at said line.

Referring first to Figs. 1 to 4 inclusive, the main frame of the machine comprises a base 1, corner posts 2 and a top plate 3. Key levers 4 cooperate with a fulcrum plate 5 at the rear of the base, each key lever being provided with a restoring spring 6 and having pivoted to it at 7 a sub-lever 8. The

lower end portion of each sub-lever is slotted at 9 to cooperate with a fixed abutment 10 and the upper end of each sub-lever is connected by a link 11 to a type bar 12. The type bars are mounted in hangers 13, said hangers being arranged in a segment of a circle and being secured each by a screw 14 to a segmental type bar support 15 suitably mounted on the frame of the machine. The type bars cooperate with the front face of a platen 16 (diagrammatically illustrated), said platen being mounted in a platen carrier (not shown), said carrier being guided and supported on the usual or suitable guide ways and being connected by a band or strap 17 with a spring drum 18 which tends constantly to draw the platen and platen carrier leftward across the top plate. The leftward movements of the platen carrier and platen are controlled by the usual or suitable escapement devices (not shown), certain of said devices being connected by a link 19 with the central arm 20 of a universal bar frame, said frame also comprising a rock shaft 21 and a universal bar 22 and being provided with a restoring spring (not shown). Said universal bar underlies the set of key levers 4 and is adapted, when one of said key levers is depressed, to cause the escapement devices to operate to permit of a letter space movement of the carriage under the influence of the spring drum 18. The parts thus far described are not novel and a further description thereof is not deemed necessary.

A ribbon 23 is mounted on ribbon spools 24 arranged above the top plate one at each side of the machine and forward of the platen. Each ribbon spool is fixedly secured at the top of a vertical ribbon spool shaft 25, said shaft being journaled in fixed bearings 26, so that while the shaft turns freely in its bearings the axis of rotation of the ribbon spool is fixed and unvarying. A small beveled gear 27 is fixed to the lower end portion of each shaft 25, said gear constantly meshing with a beveled pinion 28 fixed at the forward end of a horizontally disposed and rearwardly extending shaft 29, said shaft being journaled in lugs or arms 30 depending from the top plate. At its rear the shaft 29 carries a beveled gear 31 which is adapted to mesh with a driving pinion 32 fixed on a driving or power shaft 33 journaled on lugs (one of which is shown in

Fig. 6 and there designated as 33^a), depending from the top plate. The shaft 33 is connected with the spring drum 18 by constantly meshing beveled pinions 34 and 35. The pinion 34 is so connected with the driving shaft that it is compelled to turn always with said shaft but the shaft may move endwise relatively to the pinion 34 without affecting the latter. The pinion 35 is so connected with the spring drum that during the turning movements of the latter in one direction said pinion 35 is compelled to turn with said spring drum but during the turning movements of said drum in the other direction the pinion 35 is not affected. It is not thought necessary to describe the mechanism for feeding the ribbon longitudinally in greater detail since this mechanism is not novel and is or may be substantially the same as that employed in the Monarch typewriter. It will be understood that each ribbon spool is provided with a similar gear train to that above described, beginning with the gear 27 and terminating with the gear 31, and that the gears 31 are adapted to mesh alternately with their cooperating driving pinions 32. These latter are fixed to the driving shaft 33 in such a way that when the latter is shifted back and forth endwise one or the other of said driving pinions 32 is rendered operative. The to and fro shifting movement of the driving shaft may be effected either manually or automatically in any desired way, such for example as that employed in the machine to which my invention is shown as applied. But the mechanism for reversing the automatically longitudinal feed of the ribbon is not illustrated in this case.

Referring now to the novel parts of my invention, these comprise a vibratory ribbon carrier or guide, which, in the present instance, is in the form of a right angled member having an upright arm 36 and a horizontal arm 37. The upright arm 36 is arranged in front of the platen and at one side, preferably the right side, of the printing point thereon. Said arm is provided with two ribbon receiving slots 38 and 39, said slots being parallel and oblique and disposed one above and one below the printing point and printing line on the platen. These slots 38 and 39 are formed in the vibrator to provide two parallel and obliquely arranged turning bars or devices marked 38^a and 39^a, but said turning bars or devices may be otherwise formed or provided. These slots and turning bars are inclined at an angle of 45° to the vertical and the upper one lies above a line connecting the ribbon spools while the lower one lies below such line. The ribbon extends from the right-hand spool upwardly and inwardly toward the middle of the machine, passing in front of the arm 36 through the slot 38 after which it takes a turn over the

bar 38^a and passes vertically downward behind the arm 36, thence forwardly through the slot 39, after which it takes another turn over the bar 39^a and inclines upwardly and outwardly or toward the left to the left-hand spool. The vertical portion of the ribbon, or that portion between the slots or turning bars which may be called the printing portion of the ribbon, is of a single thickness or ply of ribbon and lies close to the platen, the left edge of said printing portion being just to the right of the printing point. This arrangement is shown clearly in Fig. 2 wherein one of the type blocks is indicated in the printing position by a dotted line designated by 12^a. It will be seen from an inspection of Fig. 2 that the length of the printing portion of the ribbon is such that when this printing portion is swung over to cover the printing point by mechanism, presently to be described, the type bars may print upon it without being interfered with by the arm 36, either by that portion of said arm in which the slots 38 and 39 are cut or by the upright portion of said arm between and connecting the slot portions. The head of the vibrator consists essentially of the top turning bar, bottom turning bar, and right-hand connecting neck or bar 36^a, the left-hand side of the head being entirely cut away or open between the turning bars so that no portion of the head can be struck by the types when the vibrator is moved sidewise for the types to strike the ribbon. This upright portion 36^a is narrow or cut away as shown in Fig. 2 so that its left-hand edge clears the right-hand edge of the printing portion of the ribbon. The upright arm 36 is, as stated, preferably integral with the horizontal arm 37, although it will be obvious that this is not essential. The arm 37 extends rearwardly beneath the top plate and terminates in a collar portion 37^a, which receives a headed shouldered screw 40, the latter entering a threaded opening in the top plate and serving as a pivot or fulcrum for the carrier. A wire spring 41 is coiled around the collar 37^a and tends constantly to turn the arm 36 of the carrier rightward away from the printing point and to maintain said arm and the printing portion of the ribbon in the normal position shown in Fig. 2.

The carrier or guide is adapted to be vibrated or operated by novel mechanism which will now be described. This mechanism is supported on a U-shaped bracket 42 which is secured, at the left of the carrier arm or lever arm 37, to the under side of the top plate by headed screws 43. Supporting arms 42^a of the bracket extend downward from the top plate and are curved at their lower end portions toward the right to underlie the arm 37. Journaled in the lower end portions of the arms 42^a is a rock shaft 130

44 provided with a spline 45. Mounted to slide on the rock shaft is a sleeve 46 which is provided with an annular groove 47 by which the sleeve is connected with actuating mechanism presently to be described. The bore of the sleeve is grooved for the passage of the spline 45 and the sleeve is thus so connected with the rock shaft 44 as to be compelled always to turn or rock when said shaft is rocked in a manner presently to be described. The rocking motion of the shaft is conveyed to the lever arm 37 by a cylindrical arm or connecting member 48 which is fixed at its lower end in the sleeve 46 and extends upwardly therefrom. As shown clearly in Fig. 3 the arm or pin 48 is split or slotted as indicated at 49, thereby providing two spring fingers 48^a. Each of these fingers is provided near its upper end with an off-set or ledge 50. As shown in Figs. 1 and 2 the fingers 48^a are adapted to enter and engage a circular opening or hole 51 formed in the carrier arm or lever arm 37. The circular opening 51 is connected by a slot 52 with a similar circular opening 53 formed in the arm 37 nearer the fulcrum or pivot thereof than is the opening 51. When the sleeve 46 is slid rearward on the rock shaft 44 the spring fingers 48^a are forced toward each other and enter the slot 52 which is less in width than the diameter of the openings 51 and 53. During the rearward movement of the sleeve 46 the fingers 48^a traverse the slot 52 until the opening 53 is reached when the inherent spring in said fingers forces them apart and causes them to engage with or become seated in the opening 53. The construction is such that the sleeve 46 and the arm or connecting member 48 are adapted to be set in either one of a plurality of operative relations with the arm 37 of the ribbon carrier. The lugs or ledges 50 cooperate with the under side of the arm 37 and serve as a support for said arm in either of the set positions of the spring fingers 48^a. Obviously when the rock shaft 44 is turned or rocked in the direction of the arrow in Fig. 2 the ribbon carrier will be rotated on its pivot 40 toward the printing point. This rocking motion is conveyed from the universal bar frame to the rock shaft by a connection comprising a crank arm 54 provided with a collar portion 55 which receives the rock shaft 44 and is secured thereto by a pin 56. The crank arm 54 projects horizontally leftward from the rock shaft and its outer end is connected by a link 57 with the central arm 20 of the universal bar frame. It will be noted that the crank arm 54, the rock shaft 44, the sleeve 46 and the arm 48 constitute in effect a bell crank lever having an elongated pivot and relatively movable arms and that when the universal bar 22 is depressed by any of the key levers 4, when the latter are operated to cause their

associate type bars to print, the line 57 will operate to actuate said bell crank and throw the ribbon carrier sidewise leftward, causing the printing portion of the ribbon to cover the printing point on the platen. The extent of the leftward movement or throw of the ribbon carrier will depend upon the position which the arm 48 occupies with relation to the carrier. The parts are so proportioned and arranged that when the arm 48 is positioned as shown in Figs. 1, 3 and 4, the carrier will be moved sidewise far enough only to bring the left-hand side or half portion of the printing portion of the ribbon over the printing point. When the arm 48 is shifted rearward and the spring fingers 48^a engage with the opening 53 the same extent of movement communicated to the arm 48 through the printing keys will, of course, serve to throw the ribbon carrier a greater distance since the arm 48 is now nearer the fulcrum of said carrier, this greater extent being sufficient to bring the right-hand side or half of the printing portion of the ribbon over the printing point.

Referring to the means for sliding the sleeve 46 to and fro on the rock shaft 44 and thereby setting the arm or connecting member 48, said means comprises a lever 58 provided with a collar 59, said collar receiving a shouldered pivot screw 60 which enters a threaded opening in the under side of the top plate, thereby pivoting said lever between its ends. The left or inner arm 58^a of the lever 58 is forked or bifurcated at its inner end, the arms 58^b of the bifurcation loosely embracing the sleeve 46 and being provided at their ends with inwardly projecting pins which enter the depression or groove 47 in the sleeve 46. The right-hand or outer arm 58^c is shaped as shown in Fig. 4 and terminates outside of the right-hand edge of the top plate, being there provided with an upwardly projecting finger piece or handle 62. It will be understood that when the parts are in the relations shown in Fig. 4 and it is desired to position them to secure the longer throw of the ribbon carrier, the handle 62 may be grasped and pulled forward, thereby causing the pin 61 to press against the rear wall of the groove 47 and force the sleeve 46 and arm 48 rearward until the spring fingers 48^a enter the opening 53 and thus hold the parts in the adjusted position.

From what has been said it will be understood that I have provided a vibratory ribbon mechanism including a ribbon carrier which is normally at one side of the printing point and which is adapted when the printing keys are operated to be moved one of a plurality of predetermined extents lengthwise of the platen or sidewise from normal position and thereby to cause the printing portion of the ribbon to cover the printing

point with either the left-hand side portion or the right-hand side portion of said printing portion of the ribbon, said printing portion comprising only a single thickness or ply of ribbon and extending between the two turning bars.

Obviously, the mechanism above described and explained may be employed with a ribbon having uniform characteristics throughout and certain features of my invention can be advantageously employed if the ribbon carrier have only a single extent of movement or throw. The mechanism which I have described, however, for giving the ribbon different extents of throw enables a ribbon of uniform character to be more thoroughly exhausted than would a single-throw mechanism; and the described mechanism is particularly adapted for use with a ribbon having printing fields or longitudinal stripes of different characteristics, such, for example, as a ribbon having one field of record ink and another field of copying ink, or one field of one color and another field of a different color. In the drawings thus far particularly described I have illustrated such a two-color ribbon 23, one of the fields *a* whereof may, for descriptive purposes, be considered as black in color and the other field *b* as red in color. The field *a* at the printing portion of the ribbon is shown as normally nearer the printing point than is the field *b* and it will be understood that when the parts are adjusted to the position shown in Figs. 1, 3 and 4, an actuation of the printing key will cause the field *a* to cover the printing point. When it is desired to make use of the field *b* or red field the handle 62 is pulled forward and the arm 48 set in its rearmost position. To return to the use of the black field thereafter it is only necessary to push the handle 62 rearward and cause the parts to resume the relations shown in Figs. 1, 3 and 4.

Various changes may be made in my invention without departing from the scope thereof. An example of such changes is shown in Figs. 5 and 6 of the drawings which figures illustrate a further development of the invention wherein the throw of the ribbon may be manually varied predetermined extents as in the first described construction and may, alternatively, also be progressively varied automatically. In Figs. 5 and 6 a vibratory carrier is provided having as in the first instance a vertical arm 63 and an integral horizontal arm 64 pivoted at 65. The arm 63 is as before provided with parallel and oblique turning bars 66 and 67, one above and one below the printing point, and a ribbon 68 is threaded through these slots and wound upon the ribbon spools (not shown). The mechanism for turning the spools and for feeding the ribbon longitudinally is or may be the same

as in the first form. The horizontal arm 64 of the carrier is formed with a longitudinally extending slot 69 with which engages a connecting member or arm 70 extending upward from a sleeve 71 formed with a circumferential groove 72 and replacing the sleeve 46 on the rock shaft 44, the rock shaft being connected with the universal bar frame as before by the crank arm 54 and the link 57. The sliding movements of the sleeve 71 are controlled by a lever 73 pivoted on a shouldered screw 74 which screws up into the top plate from the under side. The inner end of the lever 73 is forked as indicated at 75, the forks being provided with pins 76 which enter the groove or depression 72 in the sleeve 71. The outer end of the lever 73 is provided with an upwardly extending finger piece or handle 77 and with a downwardly extending conical projection or pin 78. The left or inner arm of the lever is connected with one end of a coiled draw spring 79 which extends rearwardly and horizontally beneath the top plate and is hooked at its rear end around the pin or lug 80 depending from the top plate. The draw spring 79 tends constantly to pull the inner arm of the lever 73 rearward and thereby to slide the sleeve 71 rearward on the rock shaft 44 and force the arm or projection 70 rearward in the slot 69. In this form of my invention I provide two means for controlling the movements of the lever 73 and through said lever the movements of the sleeve 71 and the arm 70. These means are operative alternately or at different times, one of them being automatic and one manually controlled.

Referring first to the automatic means, this comprises an arm 81 depending from the inner arm of the lever 73 and cooperating with the eccentric face 82 of a controlling member 83, which member is slidably mounted on the ribbon driving shaft 33 and so connected therewith as to always turn with said shaft. The shaft 33 may, however, be moved lengthwise independently of the member 83, and said member may be slid along the shaft without affecting the shaft. The connection between the two parts may be of any desired character for effecting these results, such, for example, as a pin and slot connection, the pin or screw 84 being in an extension or collar portion 85 of said member 83 and the slot 86 being formed lengthwise of the shaft 33 and receiving the inner end of the screw or pin 84.

The collar portion 85 is formed with a circumferential depression 87 which receives a forked arm 88 depending from a collar 89, the forked arm and collar forming part of the means for manually controlling the ribbon throw. Said manual controlling means further comprises a slide rod 90 which is arranged beneath the top plate and is slid-

able in the right-hand lug 33^a supporting the driving shaft 33, said slide rod being also supported on and slidable in an angled bracket 91 which is secured to the top plate by a screw 92 and depends from said top plate near the right-hand side thereof. The collar 89 is fixed to the inner end of the slide rod by a pin 89^a and the slide rod is adapted to be set in one or another of two positions for purposes presently to be explained. The means for accomplishing this setting comprises a spring detent 93 secured to the under side of the top plate by a screw 94 and coöperative with depressions or notches 95 and 96 formed in the top of the slide rod 90. Said slide rod is further provided with a finger piece 97 at its right-hand or outer end. To the left of the finger piece a collar 98 is secured to the slide rod by a pin 99, said collar being provided with a horizontal arm 100 extending forwardly beneath the top plate and formed with two depressions 101 and 102, which depressions are adapted to coöperate with the conical pin 78 as will hereinafter be explained. A pin 103 projects horizontally rearward from the arm 98 and connected with this pin is the right-hand end of a draw spring 104, said draw spring extending leftward parallel with the slide rod 90 and being connected at the left with a pin 105 projecting rearwardly from the lug 33^a. The tendency of the spring 104 is to constantly force the slide rod and the member 83 toward the left.

Referring first to the operation of the means for automatically varying the ribbon throw and assuming that the parts are in the relations shown by the full lines in Figs. 5 and 6, it will be understood that when a printing key is operated the universal bar frame will be depressed and the link 57 drawn down, turning the rock shaft 44 and the arm 70 toward the left. This arm or connecting member controls, through the slot 69, the vibratory ribbon carrier or guide and when said arm is moved as just explained, said guide will be thrown from normal position to a position which will cause the vertically disposed or printing portion of the ribbon to cover the printing point on the platen, the parts returning to normal position after the printing operation. It will further be understood that the extent of this throw or movement of the vibrator from normal position will depend upon the position of the arm or connection 70 with respect to the slot 69. The operating movement of the arm 70 is always substantially the same in extent but its effect on the vibratory ribbon carrier will depend on its position in the slot. The extent of movement of said carrier will, of course, increase as the arm or connection 70 is moved from the front to the rear in the slot 69. This movement is automatically controlled by the member 83. The

spring 79 is constantly acting to maintain the arm 81 in contact with the eccentric face 82 of said member 83. The member 83 is forced to turn by the ribbon driving shaft 33 during movements of the carriage and platen in one direction, and since the face 82 is eccentric to the axis of rotation of said shaft the position of the pin 81 and the lever which carries it will constantly be varied during the movements of the carriage in one direction, this direction being the printing direction preferably and according to the construction in the Monarch machine. As shown in Fig. 5 the left arm of the lever 73 is in its extreme forward position and the connecting member 70 is at the forward end of the slot 69. Consequently if a printing key were actuated the vibratory carrier will receive the least extent of movement of which it is capable under proper operation. Gradually, however, during subsequent printing operations, the ribbon driving shaft will be turned and that portion of the eccentric face 82 which is of greatest radius will pass out of engagement with the pin 81, permitting the draw spring 70 to draw the sleeve 71 and the connection 70 rearward until finally said connection reaches the rear end of the slot 69, after which it will be gradually forced forward again by the eccentric face 82 and its coöperating pin 81, the pin always riding against the eccentric face. The result will be that the throw of the vibratory carrier or guide will be progressively varied between its least and greatest limits and vice versa and the path followed by the type impressions on the ribbon will be in a serpentine line which curves back and forth from one edge of the ribbon to the other. With the automatically varying mechanism in operation it is usual to employ a ribbon of uniform characteristics and I have shown such a ribbon 68 in Figs. 5 and 6.

A ribbon having fields of different characteristics, such for example, as the two color ribbon 23 might, of course, be employed with the second form of the invention when the latter is arranged as hereinbefore described, if variegated or fancy printing be desired. Usually, of course, when a two-color ribbon is employed it is desired to write with one color or the other at will and accordingly I provide means for dispensing with the automatic progressive variation of the throw of the vibratory carrier, which variation results in an automatic cross feed of the ribbon, and further provide means for setting the mechanism so that the ribbon will be thrown one or another of a plurality of predetermined extents to enable one ribbon field or the other to be used. Assuming that the two-color ribbon is in place in the machine and that the parts are in the relations shown in Figs. 5 and 6, and further assuming that it is de-

sired to make use of the field of the ribbon nearer the printing point, the operator grasps the button 97 and pulls the slide rod 90 toward the right or outward until the
 5 detent 93, disengaging from the notch 95, engages with the notch 96. This causes the guide arm 88 to pull the member 83 rightward and move the eccentric face 82 out of engagement with the pin 81 as shown by the
 10 dotted lines in Fig. 5. The rightward movement of the slide rod also moves the arm 100 rightward to the dotted line position shown in Fig. 5 and brings the depressions 101 and 102 in said arm into the path of
 15 movement of the conical pin 78. The rightward movement of the slide rod 90 having been completed, the handle 77 may be used to seat the pin 78 in the depression 101. When the pin and depression are interseated
 20 the lever 73 will be in the position shown in full lines in Fig. 5 and consequently the parts will be set to cause the least or shortest throw of the vibratory carrier, bringing the ribbon field at the left-hand side of the printing
 25 portion of the ribbon into operation. The friction between the pin 78 and the depression 101, due to the resilience of the outer arm of the lever 73 is sufficient to overcome the tension of the spring 79. When it
 30 is desired to make use of the other side or half of the printing portion of the ribbon the parts may be set for this purpose by pulling the handle 77 forward until the pin 78, disengaging from the depression 101, be-
 35 comes seated in the depression 102. This resetting of the lever 73 forces the sleeve 71 and pin 70 rearward until said pin is in position to cooperate with the rear end portion of the slot 69 and consequently to give the
 40 ribbon carrier its greatest throw. When it is again desired to make use of the automatic means for varying the ribbon throw the finger piece 97 may be pushed inward until the detent 93 reengages with the notch 95 or the
 45 handle 77 may be raised to disengage the pin 78 from the arm 100 whereupon the spring 104 will pull the rod 90 back to a position where the detent 93 will engage the notch 95, this movement of the rod being limited
 50 by a stop 90^a, which abuts the right-hand face of the lug 33^a. This inward movement of the rod 90 brings the pin 81 again into proper relationship to the eccentric face 82. If the change be made when the pin 78 is
 55 seated in the depression 102, the return or inward movement of the rod 90, carrying with it as it does the eccentric, will cause the cone-shaped portion 83^a of the member 83 to cam forwardly the pin or arm 81 and
 60 thus automatically bring it into proper relationship with the eccentric face of said member and restore the parts to the condition shown at Fig. 5. The leftward or inward movement of the slide rod 90 carries

the arm 100 out of the path of said pin 78 so that the subsequent automatic movements of the lever 73 will not be interfered with by said arm 100.

Usually, in visible writing machines the normal position of the vibratory carrier is below the platen scale and consequently the carrier has to be raised or moved a considerable distance to bring the ribbon over the printing point. Furthermore, the weight of the vibratory carrier and other parts is as a rule to be lifted by the finger of the operator, thereby adding to the heaviness of the touch. By employing my invention these disadvantages are to a large extent done away with, the printing portion of the ribbon may be normally arranged as close as possible to the printing point thus minimizing the extent of movement or throw of the carrier, and furthermore instead of having to lift the weight of said carrier it need be only moved or swung sidewise on its pivot. Furthermore, when a two-color ribbon is employed it is possible to use a narrow width of ribbon and still avoid any danger of encroaching upon one of the ribbon fields when printing from the other ribbon field. This defect is found in two-color ribbon mechanisms heretofore employed and is especially difficult to avoid with long characters such as the "g" sign and it is one of the main objects of my invention to avoid this defect and provide a construction wherein the longitudinal stripe or stripes of the printing portion of the ribbon run or are disposed parallel with the length of the type when the latter is in the printing position, so that no matter how long the character may be it does not encroach on the other adjacent field which is, of course, at one side or the other of the character being impressed, instead of above or below said character as heretofore.

Various other changes may be made without departing from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools having fixed axes and paths of rotation and carrying a ribbon, means co-operating with the ribbon to turn the printing portion thereof to stand normally at one side of the printing point, and means for automatically moving the ribbon sidewise to cover the printing point when the printing instrumentalities are actuated.

2. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools having fixed axes and paths of rotation and carrying a ribbon, means co-operating with the ribbon to maintain the printing portion thereof normally at the right of the printing point, and means for

automatically moving the ribbon leftward to cover the printing point when the printing instrumentalities are actuated.

3 In a typewriting machine, the combination of a horizontally arranged platen, printing instrumentalities, ribbon spools having fixed axes and paths of rotation and carrying a ribbon, means for maintaining the printing portion of said ribbon at one side of the printing point and means for automatically moving the ribbon lengthwise of the platen to cover the printing point when the printing instrumentalities are actuated.

4. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools mounted to rotate in fixed bearings on the frame-work, a vibratory ribbon carrier disposed normally at one side of the printing point, and means for automatically moving said carrier sidewise to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

5. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools mounted to rotate in fixed bearings on the frame-work, a vibratory ribbon carrier disposed normally at the right of the printing point, and means for automatically moving the ribbon carrier sidewise to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

6. In a typewriting machine, the combination of a horizontally arranged platen, printing instrumentalities, ribbon spools mounted to rotate in fixed bearings on the frame-work, a ribbon carrier normally maintaining the ribbon away from the printing point, and means for automatically moving the ribbon carrier lengthwise of the platen to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

7. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools, a ribbon carrier disposed normally at one side of the printing point, and means for automatically moving the ribbon carrier sidewise independently of the ribbon spools to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

8. In a ribbon mechanism for front strike writing machines, means including a vibratory ribbon carrier having right and left turning devices for guiding and feeding the ribbon up and down past the printing point and laterally toward the right and left and for moving the ribbon sidewise to cover the printing point.

9. In a typewriting machine, the combination of a platen, printing instrumentalities, a vibratory ribbon carrier having a fixed axis of rotation and normally disposed at

one side of the printing point, and means for automatically moving the ribbon carrier to move the ribbon sidewise to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

10. In a typewriting machine, the combination of a horizontally arranged platen, printing instrumentalities, a vibratory ribbon carrier having a fixed axis of rotation, and means for automatically moving said ribbon carrier to move the ribbon lengthwise of the platen to cause the ribbon to cover the printing point when the printing instrumentalities are actuated.

11. In a front-strike typewriting machine, the combination of a platen, printing instrumentalities, a vibratory ribbon carrier having turning devices arranged normally one above and one below the printing point, and the ribbon passing from one turning device to the other crosswise of the writing line, and means for automatically moving the ribbon carrier to cause the ribbon to cover the printing point.

12. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools carrying a ribbon, means whereby the printing portion of said ribbon is turned to stand normally at one side of the printing point, and means for moving the ribbon different extents sidewise to cover the printing point when the printing instrumentalities are actuated.

13. In a typewriting machine, the combination of a platen, printing instrumentalities, ribbon spools, a ribbon, means whereby the printing portion of said ribbon is maintained normally at the right side of the printing point while the portions of the ribbon running from the printing portion to said spools are maintained substantially at opposite sides of the printing line, and means for moving the ribbon different extents toward the left to cover the printing point when the printing instrumentalities are actuated.

14. In a typewriting machine, the combination of a horizontally arranged platen, printing instrumentalities, ribbon spools carrying a ribbon, means whereby the printing portion of said ribbon is maintained normally at one side of the printing point while the portions of the ribbon running from the printing portion to said spools are maintained substantially at opposite sides of the printing line, and means for moving the ribbon different extents lengthwise of the platen to cover the printing point when the printing instrumentalities are actuated.

15. In a typewriting machine, the combination of a horizontally arranged platen, printing instrumentalities, ribbon spools carrying a ribbon, means whereby the printing portion of said ribbon is maintained normally at one side of the printing point while

the portions of the ribbon running from the printing portion to said spools are maintained substantially at opposite sides of the printing line, means for moving the ribbon
5 different extents lengthwise of the platen to cover the printing point when the printing instrumentalities are actuated, and means for varying the last named means to vary the extent of movement of said ribbon.

10 16. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which normally maintains the printing portion of the ribbon
15 crosswise of the printing line, means for moving the carrier to cause the ribbon to cover the printing point, and means for varying said last named means to enable the carrier to move the ribbon different predetermined extents including a member
20 movable to and fro between predetermined limits and settable at said limits, said member being free when moving between its set positions.

25 17. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which normally maintains the printing portion of the ribbon
30 crosswise of the printing line, means for moving the carrier to cause the ribbon to cover the printing point, and means for varying the last named means to vary the extent of movement of said carrier, said
35 last recited means being operative by hand and including a finger piece movable to different set positions and free during movements from one set position to another.

40 18. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism which normally maintains the printing portion of the ribbon crosswise of the printing line and
45 which includes means for moving the ribbon at printing operations to and fro to cover and uncover the printing point, an automatically controlled means for varying the last named means to vary the extent of the to and fro movements of the ribbon.

50 19. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism which guides the printing portion of the ribbon crosswise
55 of the direction of the lines of print and which includes means for moving the ribbon at printing operations to and fro to cover and uncover the printing point, and automatically controlled means for varying the last named means to vary the extent of the to
60 and fro movements of the ribbon whereby the ribbon is caused to move progressively increasing and decreasing distances from a single normal position.

65 20. In a typewriting machine, the combination with a platen and printing instrumen-

talities, of ribbon mechanism which guides the printing portion of the ribbon crosswise of the direction of the lines of print and which includes means for moving the ribbon
70 at printing operations to and fro, to cover and uncover the printing point, and alternative means for varying the last recited means, one of said alternative means being hand-controlled and the other being automatic,
75 said hand-controlled means being adjustable to cause the ribbon to be thrown any one of a plurality of predetermined extents.

21. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing
80 portion of the ribbon crosswise of the direction of the lines of print, means for moving the carrier to cause the ribbon to cover the printing point, and alternative means for
85 varying the last named means to vary the extent of movement of said carrier.

22. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing
90 portion of the ribbon crosswise of the direction of the lines of print, means for moving the carrier to cause the ribbon to cover the printing point, and alternative means for
95 varying the last named means to vary the extent of movement of said carrier, one of said alternative means being hand-controlled and the other being automatic.

23. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing
100 portion of the ribbon crosswise of the direction of the lines of print, means for moving the carrier to cause the ribbon to cover the printing point, and alternative means for
105 varying the last named means to vary the extent of movement of said carrier, one of said alternative means being hand-controlled and the other being automatic, said hand-controlled means being adjustable to cause the ribbon to be thrown any one of a plurality of predetermined extents.

24. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing
115 portion of the ribbon crosswise of the direction of the lines of print, means for moving the carrier to cause the ribbon to cover the printing point, and automatically controlled means for varying the last named means to vary the extent of movement of said carrier.

25. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing
120 portion of the ribbon crosswise of the direction of the lines of print, said carrier being
130

an angled member having a substantially vertical arm and a substantially horizontal arm, the latter arm having a fixed substantially vertical axis of rotation, and means for actuating said carrier.

26. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism including a vibratory carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print, and is movable to cause the ribbon to cover the printing point, said carrier having a horizontally disposed pivoted arm the axis of rotation whereof is fixed and substantially vertical, and means for actuating said arm.

27. In a typewriting machine, the combination with a platen and printing instrumentalities, of a vibratory ribbon carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print, and is movable to cause the ribbon to cover the printing point, said carrier having a horizontally disposed pivoted arm the axis of rotation whereof is fixed and substantially vertical, said arm being provided with an opening, and means co-acting with said opening to actuate said carrier.

28. In a typewriting machine, the combination with a platen and printing instrumentalities, of a vibratory ribbon carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print, and is movable to cause the ribbon to cover the printing point, said carrier having a horizontally disposed pivoted arm the axis of rotation whereof is fixed and substantially vertical, said arm being formed with a slot, and actuating means for said carrier, said actuating means comprising a connecting member adapted to occupy different positions relative to said slot.

29. In a typewriting machine, the combination with a platen and printing instrumentalities, of a vibratory ribbon carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print, and is movable to cause the ribbon to cover the printing point, said carrier having a horizontally disposed pivoted arm the axis of rotation whereof is fixed and substantially vertical, said arm being formed with a slot, and actuating means for said carrier, said actuating means comprising a connecting member adapted to occupy different positions relative to said slot, and means for manually setting said connecting member in one or another of a plurality of predetermined positions.

30. In a typewriting machine, the combination with a platen and printing instrumentalities, of a vibratory ribbon carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print and is movable to cause the ribbon

to cover the printing point, said carrier having a horizontally disposed pivoted arm the axis of rotation whereof is fixed and substantially vertical, said arm being formed with a slot, actuating means for said carrier, said actuating means comprising a connecting member adapted to occupy variable positions relative to said slot, means for manually setting said connecting member in one or another of a plurality of predetermined positions, and other means for automatically and progressively varying the positions of said connecting member relatively to said slot.

31. In a typewriting machine, the combination with a platen and printing instrumentalities, of a vibratory ribbon carrier which guides the printing portion of the ribbon crosswise of the direction of the lines of print and is movable to cause the ribbon to cover the printing point, said carrier having a horizontally disposed pivoted arm, the axis of rotation whereof is fixed and substantially vertical, said arm being formed with a slot, actuating means for said carrier, said actuating means comprising a connecting member adapted to occupy variable positions relative to said slot and means for automatically and progressively varying the position of said connecting member relatively to said slot.

32. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism by which the printing portion of the ribbon is guided up and down transversely of the direction of the lines of print and which mechanism includes a lever arm and actuating means therefor, said actuating means comprising a connecting member connecting with said lever arm and adapted to occupy variable normal positions relative to said arm.

33. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism by which the printing portion of the ribbon is guided up and down transversely of the direction of the lines of print and which mechanism includes a lever arm, and actuating means therefor, said actuating means comprising a connecting member connecting with said lever arm and adapted to occupy varying normal positions relative to said arm; and means for manually setting said connecting member in one or another of a plurality of predetermined positions.

34. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon mechanism by which the printing portion of the ribbon is guided up and down transversely of the direction of the lines of print and which mechanism includes a lever arm and actuating means therefor, said actuating means comprising a connecting member connecting with said

lever arm and adapted to occupy varying normal positions relative to said arm; means for manually setting said connecting member in one or another of a plurality of predetermined positions; and other means for automatically and progressively varying the position of said connecting member relative to said lever arm.

35. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon vibrating mechanism which includes a lever arm and actuating means therefor, said actuating means comprising a connecting member connecting with said lever arm, a sleeve on which said connecting member is mounted, a rock shaft, means for manually setting said sleeve at predetermined positions on said rock shaft, and connections between said rock shaft and the printing instrumentalities.

36. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon vibrating mechanism which includes a lever arm and actuating means therefor, said actuating means comprising a connecting member connecting with said lever arm, a sleeve on which said connecting member is mounted, a rock shaft carrying said sleeve and connections between said rock shaft and the printing instrumentalities; and means operating automatically to slide said sleeve to and fro on said rock shaft and vary the point of connection between said connecting member and said lever arm.

37. In a typewriting machine, the combination with a platen and printing instrumentalities, of ribbon vibrating mechanism which includes a lever arm and actuating means therefor, said actuating means comprising a connecting member connected to said lever arm, a sleeve on which said connecting member is mounted, a rock shaft carrying said sleeve and connections between said rock shaft and the printing instrumentalities; and means operating automatically to slide said sleeve to and fro on said rock shaft and vary the point of connection between said connecting member and said lever arm, said automatic means comprising a lever connected with said lever arm, an eccentric connected with the ribbon driving shaft, and connections between said eccentric and said lever.

38. Ribbon vibrating mechanism for typewriting machines, said mechanism including a bell crank lever the angular relationship between the arms whereof is unvarying, and means for varying the normal relation between the arms of said bell crank lever to vary the throw of the ribbon.

39. Ribbon vibrating mechanism for typewriting machines, said mechanism including a bell crank lever the angular relationship between the arms whereof is unvarying, and

means for moving one of the arms of said bell crank lever relatively to the other arm thereof and setting the movable arm in its new position so as to vary the throw of the ribbon.

40. In a ribbon mechanism for typewriting machines, embodying a ribbon and ribbon spools, the combination of a guide for maintaining the printing portion of the ribbon in a single ply and normally at one side of the printing point and the portions running from the printing portion to the spools substantially at opposite sides of the printing line, and means for automatically moving the printing portion of the ribbon sidewise and substantially longitudinally of the platen to cover the printing point at printing operation.

41. In a typewriting machine, the combination of a horizontally arranged platen, and ribbon mechanism including a ribbon guide which maintains a single thickness only of the ribbon normally at one side of the printing point, and means for automatically moving the printing portion of the ribbon lengthwise of the platen to cover the printing point at printing operations.

42. A ribbon mechanism for typewriting machines, said mechanism comprising means for feeding a single ply only of the ribbon up and down past the printing point and means for moving the printing portion of the single ply of the ribbon sidewise to cover the printing point at printing operation.

43. In a typewriting machine, the combination of a platen, a vibratory ribbon carrier disposed normally at one side of the printing point and provided with devices for maintaining a single thickness or ply of the ribbon normally crosswise of the printing line, and means for moving said carrier sidewise to cause the single thickness or ply of the ribbon to cover the printing point at printing operation.

44. In a typewriting machine, the combination of a horizontally arranged platen, a ribbon carrier normally maintaining the ribbon away from the printing point and provided with devices for normally maintaining a single thickness of the ribbon crosswise of the printing line, and means for automatically moving the ribbon carrier lengthwise of the platen to cause the single thickness of the ribbon to cover the printing point at printing operation.

45. Vibratory ribbon mechanism for a typewriting machine, said mechanism including a vibratory ribbon carrier provided with parallel turning devices over which the ribbon is guided and normally maintained at one side of the printing point while at all times extending crosswise of the printing line.

46. Vibratory ribbon mechanism for a

typewriting machine including a vibratory ribbon carrier provided with parallel turning bars obliquely arranged to the printing line, the ribbon being guided over said bars and normally maintained at one side of the printing point while at all times extending crosswise of the printing line.

47. Vibratory ribbon mechanism for a typewriting machine including a vibratory ribbon carrier provided with parallel turning devices obliquely arranged to the printing line, one turning device being normally at one side of said printing line and the

other turning device at the other side of said printing line, the ribbon being guided over said turning devices and normally maintained away from the printing point.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 23d day of 20 September A. D. 1907.

JACOB FELBEL.

Witnesses:

E. M. WELLS,
CHARLES E. SMITH.