

G. E. GRIFFIN.
TYPE WRITING MACHINE.
APPLICATION FILED NOV. 5, 1910.

1,058,965.

Patented Apr. 15, 1913.

2 SHEETS—SHEET 1.

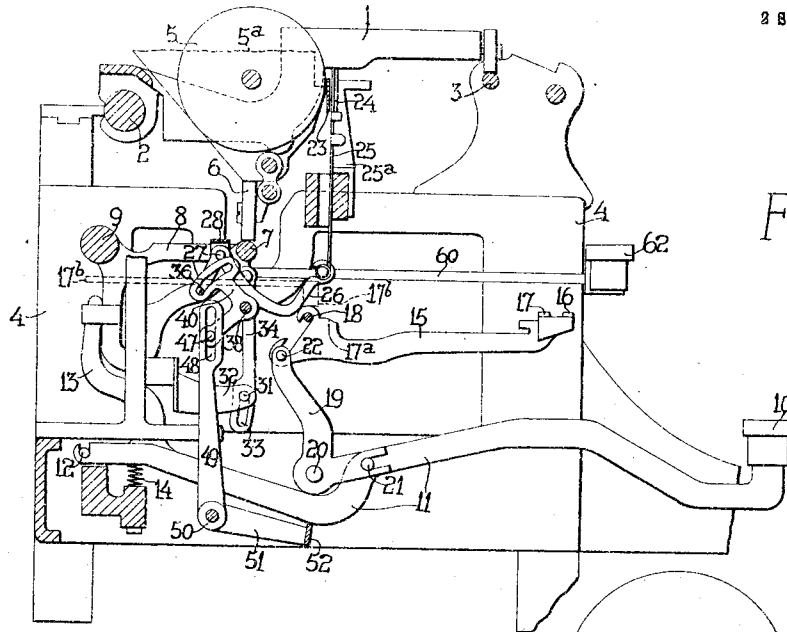


Fig. 1.

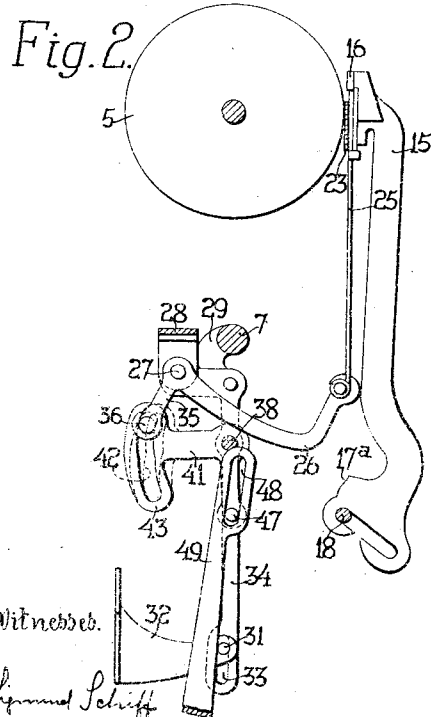


Fig. 2.

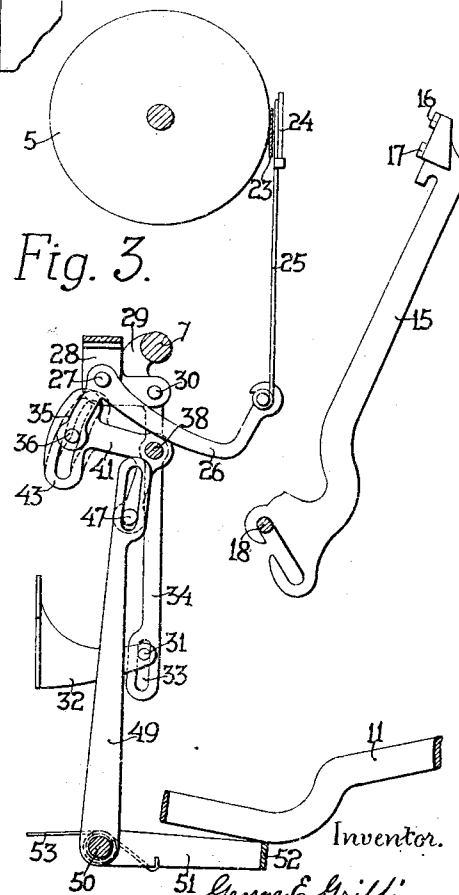


Fig. 3.

Witnesses.

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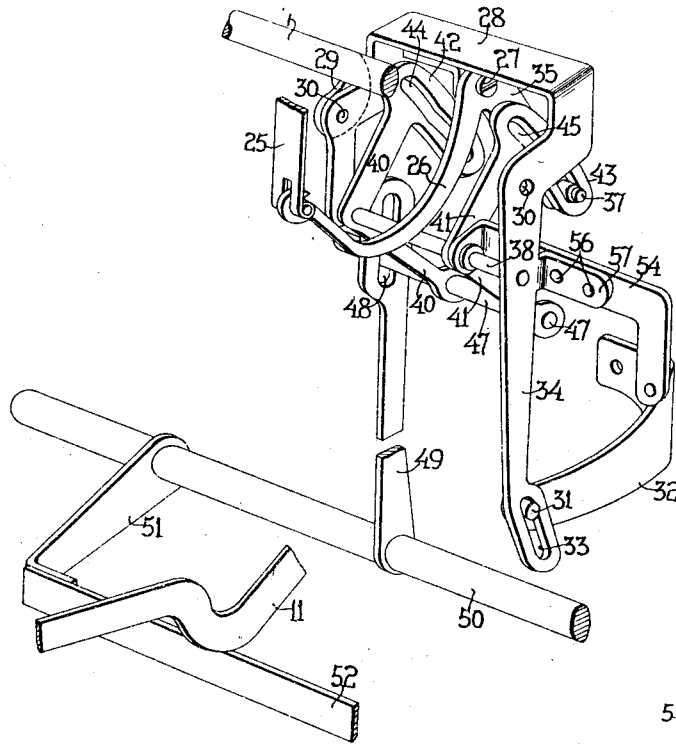


Fig. 4.

Fig. 5.

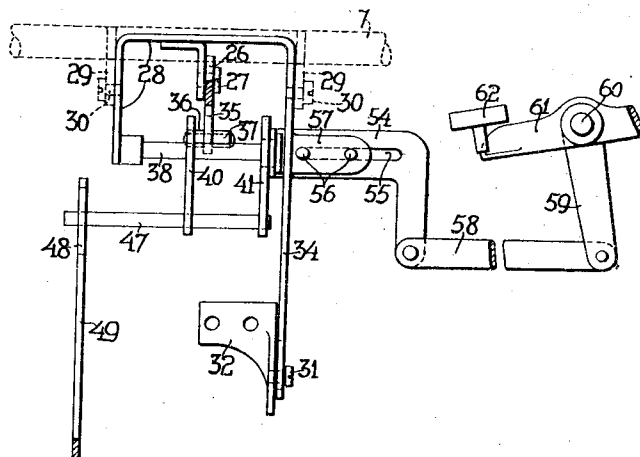
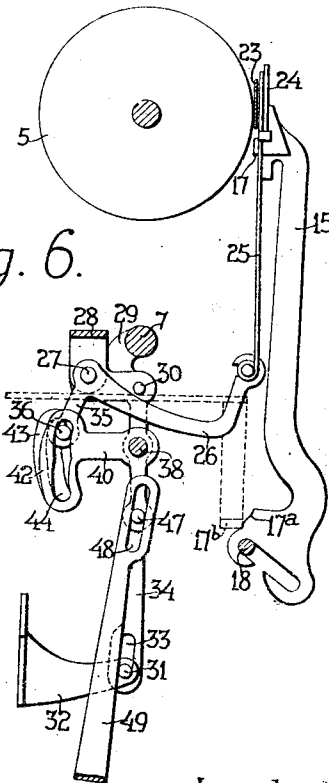


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE E. GRIFFIN, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,058,965.

Specification of Letters Patent.

Patented Apr. 15, 1913.

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To all whom it may concern:

Be it known that I, GEORGE E. GRIFFIN, a citizen of the United States, residing in the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The present invention relates to typewriting machines in which the ribbon is vibrated at the type strokes to cover and uncover the printing point.

The invention particularly relates to those machines which have mechanism for operating a polychromatic ribbon, so that any one of the color fields of the ribbon may be selected to be presented to the printing point at the type strokes. The invention is also especially adapted for use in machines in which the ribbon vibrating mechanism is shifted bodily with the ribbon between upper and lower case positions. In machines of this character, the ribbon vibrator is connected to be operated with the type bars. The connection from the keys to the ribbon carrier is such that the carrier is thrown at high speed from its normal position to the printing point, and the momentum of the parts has been such that the ribbon has been liable to overthrow. The result of the overthrow of the ribbon is that the type in part strikes off of the ribbon field. Where ribbons are employed having different stripes, the overthrow of the ribbon usually results in the type striking partly on one stripe and partly on the other. I provide a means which positively controls the movement of the ribbon carrier, to prevent overthrow of the ribbon, but which in so doing is not subject to the direct impact of rapidly moving parts, and cannot injure such parts, or appreciably wear the same. The stop of the present invention is a movable stop, which as soon as the ribbon is brought to proper position at the printing point, engages the ribbon carrying mechanism and locks the same against further movement. The stop is hereinafter shown as carried by or forming part of the ribbon vibrating mechanism, so that it must always become effective when that mechanism has completed a movement sufficient to bring the ribbon to the printing point. The stop is preferably so con-

nected to the type key levers, that the ribbon, on arriving at the printing point somewhat in advance of the type, is held by the stop or lock, not only against overthrow, but also, by means of said stop, against any movement whatever.

In the embodiment of the invention hereinafter described, the vibrator is actuated by means of a rotary member having a cam slot in which the vibrator is engaged. The stop is shown as a "dwell" in the cam slot, with which the vibrator comes into engagement at the instant the ribbon reaches the printing point. The cam member then continues to move idly with the type key mechanism while the latter brings the type to the printing point, but the vibrator remains stationary by reason of the dwell in the slot. Hence the last part of the movement of the cam member has no tendency to cause an overthrow of the ribbon carrier. In this adaptation of the invention to polychromatic ribbon mechanism there are two such cam members shiftable to permit one or the other to engage the vibrator. The two cams are differently shaped so as to throw the ribbon carrier different distances according to the ribbon field desired, but both cams nevertheless have the dwell portion for stopping or locking the carrier after the throw is completed. The invention is not limited to the use of cams for the purpose.

Other objects and features of the invention will hereinafter appear.

In the accompanying drawings, Figure 1 is a view in side elevation, partly cross sectional through the frame of the machine from front to rear, showing so much of the mechanism of the machine as relates to the present invention. Fig. 2 is a view in side elevation of the platen, the type bar, the ribbon carrier and the connections which immediately operate the latter, the type being at the printing point with the parts in lower case position. Fig. 3 is a view similar to Fig. 2 showing the position of the parts when the key has been depressed sufficiently far to bring the ribbon to the printing point, but before the completion of the stroke to bring the type bar to the printing point; the key lever being also shown in this figure. Fig. 4 is a perspective view of the ribbon vibrating mechanism, and of the

mechanism for setting the vibrator for the different color fields, one position of the latter mechanism being shown. Fig. 5 is a view in front elevation of the parts shown in Fig. 4, the ribbon setting parts being shown in another position. Fig. 6 is a view similar to Fig. 2 except that the parts are in upper case position.

The carriage 1 is shown as mounted to have longitudinal movement on rails 2 and 3 of the main frame 4 of the machine. The platen frame 5^a, carrying the platen 5, is mounted to have an up and down movement in the carriage between the lower and upper case positions. For effecting the case shifting movement of the platen, the platen frame 5^a is supported by means of a roller 6 on a guide rail 7 mounted in a shift frame 8, which latter is pivoted at 9 to the main frame 4. The shift frame 8 is operated from a key by means of a lever pivoted at 12 to the main frame and having an arm 13 attached to the shift frame. When the shift key is depressed, the shift frame is rocked around its pivot 9, lifting the rail 7, and, by means of the roller 6, shifting the platen frame and platen to upper case position. When the shift key lever is released, the weight of platen and other parts causes the same to be returned to normal or lower case position. The type keys 10 and key supporting levers 11 have no arms 13. The key levers 11 are also pivoted to the main frame at 12, and are returned to normal position, after each operation, by means of springs 14. The type levers or bars 15, carrying upper case type 16 and lower case type 17, are pivoted at 18 to the main frame, and are connected to the type key levers 11 by means of bell crank levers 19 pivoted at 20 to the main frame. The levers 19 have pin and slot connections, 21 and 22, with the levers 11 and bars 15, respectively. Depression of the keys 10 causes the type bars to be thrown to the platen in a manner well known, so that type 16 or type 17 may strike the platen at the printing point, according to the case position of the platen. The type bars have heels 17^a to operate the usual universal bar 17^b, for operating the carriage escapement.

The ribbon is shown at 23 mounted on a carrier 24 supported on a vibrator 25 by means of which the ribbon is shifted at each type stroke from a normal position below the printing point, up to the printing point and back again. The usual guide 25^a is provided for holding the vibrator in place during its movements. The ribbon is a bi-chrome ribbon having parallel color fields one above the other; and the length of the stroke of the vibrator at each operation depends upon which of the color fields it is desired to bring to the printing point.

When the lower color field is employed, the

stroke of the vibrator is longer than when the upper color field is employed. The ribbon may also be silenced, and the vibrator rendered inoperative at type strokes, when the machine is employed for stenciling.

The arm or plate 25, by means of which the ribbon is vibrated, is pivotally connected at its lower end to one arm of a bell crank lever 26 pivoted at 27 to a bracket 28 supported on arms 29 fast to the rail 7 of the shift frame. The bracket 28 and therefore the pivot 27 of the lever 26 moves with the shift frame between type case positions. The bracket 28 is also adapted to be swung slightly on the arms 29 in moving from one case position to the other and to this end is pivoted at 30 to the arms 29. The angular position of the bracket 28 on its pivots 30 and the movement of said bracket around its pivots is controlled by a pin 31 carried by arm 32 attached to the main frame. The pin 31 engages a slot 33 in a depending arm or extension 34 of the bracket. The slot is of sufficient length to permit of the case shifting movement; and is also slightly inclined to the vertical, so that a vertical movement of the bracket causes the same to be slightly rocked. The purpose of the rocking movement of the bracket is to maintain the normal position of the ribbon at the same distance from the printing point in both case positions of the platen. It will be noted that the point of support of the platen on the shift frame, to wit, the rail 7, is farther from the pivot 9 of the shift frame than is the pivot support 27 of the ribbon vibrator lever 26. Consequently the shift movement of the platen is slightly greater than that of the vibrator, and the stroke of the vibrator in upper case position would have to be greater than its stroke in lower case position to bring the ribbon to the printing point unless provision is elsewhere made to the contrary. Such provision is made by giving the bracket 28 the slight rocking movement specified, whereby the ribbon supporting arm of the lever 26 is held at a higher angle in upper than in lower case position, as will presently appear.

The lever 26 has been described as a bell crank lever one arm of which carries the ribbon carrier. The other arm 35 of this lever near its end carries two ribbon-vibrating wrist pins 36 and 37 projecting from opposite sides of the lever. Fast in the bracket 28 is a shaft 38; and on this shaft, at a distance from each other greater than the combined length of the pins 36 and 37, are two ribbon-vibrating bell crank levers 40 and 41, for giving the ribbon different throws, the lower arms of these two levers being locked together by a pin 47. The levers 40 and 41 are loose on the shaft, so that they may either turn together on the shaft, or be shifted together longitudinally

on the shaft by reason of the pin 47 which causes them to move as a unit. The upper arms of the levers 40 and 41 carry ribbon-throwing cam members 42 and 43 respectively, the cam surfaces being defined by slots 44 and 45. When the levers 40 and 41 are longitudinally positioned on the shaft 38 as shown in Fig. 5, the wrist pin 36 engages the slot 44 of the lever 40; and, if at such time the levers are rocked on the shaft 38, the rocking movement will be transmitted through the lever 40 and wrist pin 36 to the ribbon vibrator. In Fig. 4, the levers are shown in such position that the wrist pin 37 lies within the slot 45 of the lever 41; and at this time, a rocking movement of the levers would be transmitted to the ribbon vibrator through the arm 41. One only of the levers 40 and 41 can engage the vibrator at the same time; and, neither of the levers 40 and 41 can engage the vibrator when the levers are positioned centrally between the ends of the shaft 38, because in the latter event neither of the wrist pins reaches into its slot 44 or 45. Pin 47 is a wrist pin which is long enough to engage at all times a slot 48 in a lever 49, fast to a rock shaft 50 supported in the main frame of the machine. Also fast to the rock shaft 50 on each side of the machine is an arm 51; these arms 51 carrying a universal bar 52, which each key lever 11 is adapted to engage and depress. The depression of the universal bar causes shaft 50 and lever 40 to be rocked, and this movement, by means of the wrist pin 47, is transmitted to the levers 40 and 41, (which are fixed to said pin), and thence to the ribbon vibrator, if either of the wrist pins 36 and 37 is in its respective slot. A coiled spring 53 on the shaft 50 returns these parts to normal position when the key lever is released.

The slots 44 and 45 (see Fig. 6) are cut at slightly different angles, so that the cam surfaces presented thereby do not effect the same throw of the vibrator lever 26. The cam slot 44 effects a greater throw of the ribbon carrier than the slot 45, and is accordingly used when the lower strip or color field of the ribbon is desired. The cam slot 45 is used when the upper color field is desired. To select either ribbon field, or to silence the ribbon altogether as in stenciling, the levers 40 and 41 are shifted longitudinally, or set, on shaft 38 by means of appropriate key operated connections. In Figs. 4 and 5, the lever 41 is shown as pivotally attached to a slide 54 guided by means of a slot 55 on pins 56 carried by a member 57 of the bracket 28. The pins 56 by engagement with the end walls of the slot 55 limit the movement of the slide and thus determine the longitudinal position of the levers 40 and 41. Attached to the slide 54 is a link 58, the right hand end of which

is pivotally connected to an arm 59 fast on a rock shaft 60 mounted in the main frame of the machine. The shaft 60 extends to the front, and carries at the keyboard a cross piece 61 on each end of which cross piece is a key 62. According to which of the keys 62 is depressed, the shaft 60 is rocked one way or the other, and moves the slide 54 with the levers 40 and 41 to extreme right or left hand positions. When the keys 62 are set at the same elevation, the angular position of the shaft is such that the levers 40 and 41 are then in central or stenciling position on shaft 38. The keys 62 therefore set the ribbon mechanism for either color field, or for stenciling.

It will be noted upon reference to the cam slots 44 and 45, that these slots are not smooth or continuous from end to end but, that each is in effect formed by two distinct portions, which meet at a slight angle about half way between the ends of the slots. It is only the lower portions of the slots which have any cam action on the wrist pins 36 and 37. The upper portions or curves are cut on the arc of a true circle described from the pivot 38 as a center. The lower portions do not need to be curved in all cases. When the cams have been moved by the levers 40 and 41 far enough to cause the wrist pin to enter the upper portion of the curved slot, then the vibrator lever 26 not only no longer rocks during the rest of the movement of the levers 40 and 41, but is positively prevented by the side walls of the concentric portion of the slot (in the moving cam) from any movement whatever. The ribbon carrier is therefore brought to the printing point before the wrist pin enters the upper curved portion of the slot, and is thereafter positively restrained from any movement whatever during the completion of the stroke of the key lever. Overthrow of the ribbon, such as might cause the boundary line between the ribbon fields to cross the printing point, is in the present invention impossible. The ribbon is brought to its true position before the type reaches the platen. It can go no higher, nor can it drop back until after it has been struck by the type. This device for preventing overthrow of the ribbon forms a part of the operating mechanism, as distinguished from devices, such as stops and the like, which are stationary on the framework.

In operation, the ribbon mechanism is first set, by means of the keys 62, for the desired color field, or for stenciling. Thereafter, whether the shift frame is in upper or lower case position, the operation of the parts is the same. It will be recalled that the bracket 28 is attached to the shift frame, and that consequently the shaft 38 with the cam levers 40 and 41, the slide 54, and the long wrist pin 47 are all bodily lifted with

the shift frame. The slot 48 in lever 47 maintains the operating connection to the key levers during the shift, and the inclined slot 33 in the bracket member 28 slightly
 5 tilts the bracket and all the parts thereon, to compensate for the angular movement of the shift frame around the pivot 9. When then, in either case position, a key lever is depressed, it acts through the levers 19 to
 10 rock the type bars 15, and, simultaneously, it acts through the universal bar 52 to actuate the ribbon mechanism. The bar 52 and the ribbon actuating connections as far as the cam levers 40 and 41 have the full
 15 stroke of the key levers. The ribbon vibrator itself however completes its stroke and stops and locks the ribbon carrier before the stroke of the type bar and other parts is completed. Upon release of the
 20 type key, the type bar, moving with the other parts, withdraws a certain distance from the ribbon before the latter commences its return movement, which is not until the wrist pin on the lever 26 passes from the
 25 upper to the lower portion of its respective cam slot.

It will of course be understood that the time of the dwell of the ribbon carrier after the same is at the printing point may be as
 30 long or as short as desired, according to the design of the cams 43 and 44. It will also be understood that so far as a cam with a "dwell" to lock or prevent overthrow of the ribbon is concerned, such cam may be
 35 placed at any suitable point of the operating connections, and one such cam may in some instances be made to subserve this purpose even when a bichrome ribbon is used. It is apparent, however, that the invention
 40 is not limited to use in connection with bichrome ribbon mechanism.

By having two universal bars, one for the escapement and one for the ribbon vibrator, it becomes possible to distribute over
 45 the whole movement of the key the load due to operating these parts. In my mechanism, the ribbon is raised and held in position by the universal bar 52 during the beginning of the movement of the type bar.
 50 It is positively held in position and no matter how rapidly the key levers may be moved, the ribbon is in position and at rest before the type reach the platen. After the type key has positioned the ribbon, the
 55 load of operating the ribbon mechanism is practically nothing, and then the type bar itself operates the escapement universal bar.

Any suitable mechanical equivalents for the cam and other features may be adopted
 60 within the scope of the invention. Portions of the improvements may be used without others.

Having thus described my invention, I claim:

65 1. In a typewriting machine, the combi-

nation with means for vibrating the type to the printing point, of a shiftable platen, a ribbon carrier moving with the platen, means operated from said type vibrating
 70 means both to cause the carrier to bring the ribbon to the printing point at the type strokes and to lock the carrier against overthrow, and means for altering the throw of the ribbon.

2. In a typewriting machine, the combination of a ribbon carrier, a shiftable
 75 platen, and a cam moving with the platen, which at the type-strokes acts to move the carrier to bring the ribbon to the printing point and is provided with a dwell portion
 80 which thereafter acts as a stop to prevent throw of the carrier with the ribbon beyond the printing point.

3. In a typewriting machine, the combination of a ribbon carrier, a shiftable platen,
 85 and a pivoted cam member moving with the platen having a cam surface for actuating the ribbon carrier to bring the ribbon to the printing point and a surface serving as a stop to prevent overthrow of the carrier and
 90 means for altering the throw of the ribbon.

4. In a typewriting machine, the combination of a ribbon carrier, a lever attached
 95 to the carrier, for vibrating the carrier with the ribbon at the type strokes, two cams, and means for bringing either of said cams into engagement with the vibrator lever to operate the latter, said cams being of different
 100 shape, whereby the carrier may be moved by the cams different distances to bring to the printing point either one of the two color fields of a bichromatic ribbon.

5. In a typewriting machine, the combination of a ribbon carrier, a lever attached
 105 to the carrier, for vibrating the carrier with the ribbon at the type strokes, two cams, and means for bringing either of said cams into engagement with the vibrator lever to operate the latter, said cams being of different
 110 shape, whereby the carrier may be moved by the cams different distances to bring to the printing point either one of the two color fields of a bichromatic ribbon, and each of said cams having a dwell portion to engage and prevent overthrow of the
 115 vibrator when the ribbon is at the printing point.

6. In a typewriting machine, the combination of a shiftable platen, a carrier for
 120 a bichromatic ribbon moving with the platen, means for vibrating said carrier different distances at the type strokes to bring either of the color fields to the printing point, and means movable at every type stroke with the operating connections to a
 125 position to prevent overthrow of the carrier with the ribbon.

7. In a typewriting machine, the combination of a carrier for a bichromatic ribbon,
 130 an operating lever for the carrier, two wrist

pins, one attached to each side of said lever, two pivotally mounted members positioned one at each side of said carrier lever and each having a cam slot for engagement with one of said wrist pins, and means for bringing either cam member into pin and slot engagement with the operating lever, said cam slots having cam surfaces, different in shape, to throw the carrier different distances according to the ribbon field desired, and each slot having also a surface curved concentrically with the pivot of the cam member whereby after the proper ribbon field has been thrown to the printing point, the wrist pin, by engagement with the concentric portion of the slot, prevents overthrow of the carrier.

8. In a typewriting machine, the combination of a carrier for a bichromatic ribbon, an operating lever for the carrier, two wrist pins, one attached to each side of said lever, two pivotally mounted members positioned one at each side of said carrier lever and each having a cam slot for engagement with one of said wrist pins, and means for bringing either cam member into pin and slot engagement with the operating lever, said cam slots having cam surfaces, different in shape, to throw the carrier different distances according to the ribbon field desired, and each slot having also a surface curved concentrically with the pivot of the cam member whereby after the proper ribbon field has been thrown to the printing point, the wrist pin, by engagement with the concentric portion of the slot, prevents overthrow of the carrier, a pivoted frame on which said cam members are mounted to be shifted with the platen between upper and lower case position, and means for changing the initial angular position of the cams on their frame, when the latter is shifted, so that the curves of the cams may, at the proper times, operate and stop the carrier.

9. In a typewriting machine, the combination with a ribbon vibrator, of a pin to operate said vibrator, a cam to move said pin, a platen shift rail, a pivot on which said cam turns, a bar moving with said shift rail and carrying said pivot, and a guide on the frame of the machine to guide said cam with the shifting platen.

10. In a typewriting machine, the combination of a bracket moving with the shiftable platen, a vibrator carrying pins to engage with cams pivoted in said bracket and moved by a universal bar, and a link extending substantially parallel with the platen to move said cams to engage one with one of said pins to determine what color of the ribbon shall be operative.

11. In a typewriting machine, the combination with a shift rail and shiftable platen, of a bracket moving with the platen shift rail and guided by a member on the main

frame, of a pivot in the bracket carrying two cams shiftable along it and connected by a member vibrated by a universal bar, a ribbon-vibrating lever, and pins on the vibrating lever to engage one with one cam and one with the other cam to vibrate the ribbon.

12. In a typewriting machine, the combination with type-operating devices, of a shiftable platen, a ribbon carrier shifting with the platen, means connected to said type-operating devices and effective during each type-stroke to move said carrier with the ribbon to the printing point during the first part and to hold the ribbon over the printing point during the final part of the type-stroke, and means for varying the throw of the ribbon carrier.

13. In a typewriting machine, the combination with type-operating devices, of a shiftable platen, a ribbon carrier shifting with the platen, means connected to said type-operating devices and effective during each type-stroke to move said carrier with the ribbon to the printing point during the first part and to hold the ribbon over the printing point during the final part of the type-stroke, and means for varying the throw of the ribbon carrier, said type-operated means including a member to lock the ribbon carrier against movement when the ribbon covers the printing point.

14. In a typewriting machine, the combination of a shiftable platen, a ribbon carrier shifting with the platen, and a device for moving the carrier with the ribbon to cover the printing point at the type-strokes, said moving device comprising means for preventing overthrow of the carrier, and means for varying the throw of the ribbon.

15. In a ribbon vibrating mechanism, the combination of a ribbon carrier, a vibrator for said carrier, two cams, means for operating said cams at the type-strokes, and means for causing either cam to operate said vibrator, one cam constructed to move the ribbon to a different position over the printing point from the other cam, and one of said cams having a part which locks the ribbon against overthrow.

16. In a ribbon vibrating mechanism, the combination of a ribbon carrier, a vibrator for said carrier, two cams, means for operating said cams at the type-strokes, means for causing either cam to operate said vibrator, one cam constructed to move the ribbon to a different position over the printing point from the other cam, and one of said cams having a part which locks the ribbon against overthrow, and a shiftable platen; said ribbon vibrator and cams being constructed to shift said platen.

17. The combination with a ribbon vibrator, of two key-operated cams for moving said vibrator different distances, each cam

constructed to prevent overthrow of the vibrator, and shiftable means for connecting said vibrator with either cam at will.

18. The combination with a shiftable platen, of two key-operated cams shiftable with said platen, a ribbon vibrator, and shiftable means for connecting said vibrator with either cam at will, said cams constructed to operate said vibrator, and each cam including a portion to prevent overthrow of the vibrator.

19. In a typewriting machine, the combination with type-operating devices, of a shiftable platen, a ribbon carrier shifting with the platen, a cam device connected to said type-operating devices and effective during the type-strokes for moving said carrier with the ribbon to the printing point during the first part and to hold the ribbon over the printing point during the final part of the type-stroke, and means for shifting said cam device to vary the throw of the ribbon carrier.

20. In a typewriting machine, the combination with type-operating devices, of a

shiftable platen, a ribbon carrier shifting with the platen, and a cam device connected to said type-operating devices and effective during the type-strokes for moving said carrier with the ribbon to the printing point during the first part and to hold the ribbon over the printing point during the final part of the type-stroke, and means for shifting said cam device to vary the throw of the ribbon carrier, said cam device including means to lock the ribbon carrier against movement when the ribbon covers the printing point.

21. In a typewriting machine, the combination of a shiftable platen, a ribbon carrier shifting with the platen, and a cam device for moving the carrier with the ribbon to cover the printing point at the type-strokes, said cam device comprising a part for preventing overthrow of the carrier, and means for varying the throw of the ribbon.

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