

4 SHEETS—SHEET 1.



E. M. Wells.
M. F. Hannweber

Morris H. Pool
By Jacob Felber

HIS ATTORNEY

M. W. POOL.
TYPE WRITING MACHINE.
APPLICATION FILED FEB. 20, 1911.

1,040,405.

Patented Oct. 8, 1912.

4 SHEETS—SHEET 2.

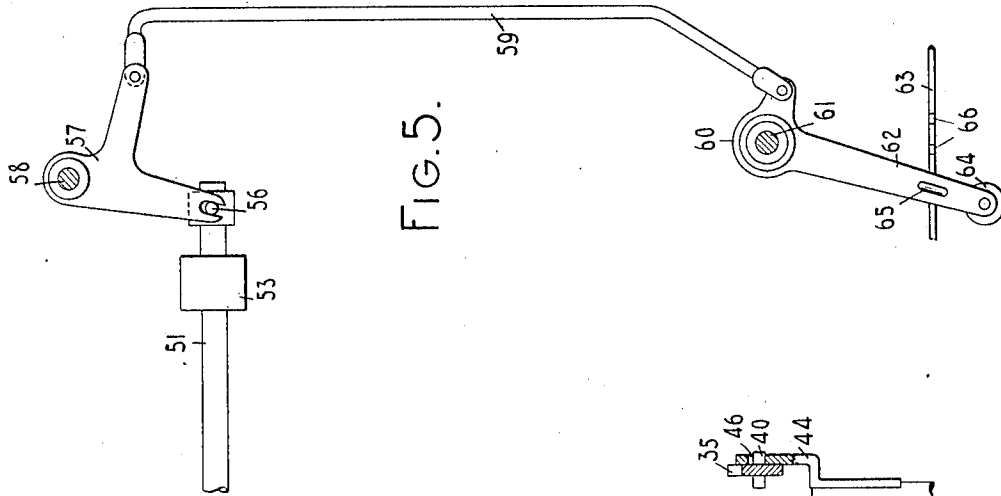


FIG. 5.

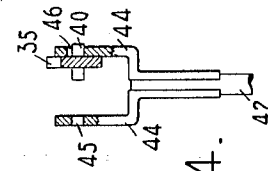


FIG. 4.

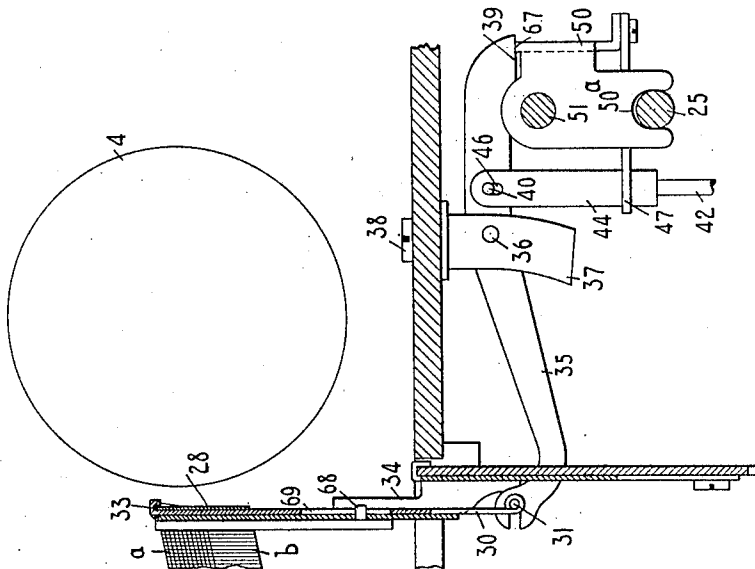


FIG. 3.

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4 SHEETS—SHEET 3.

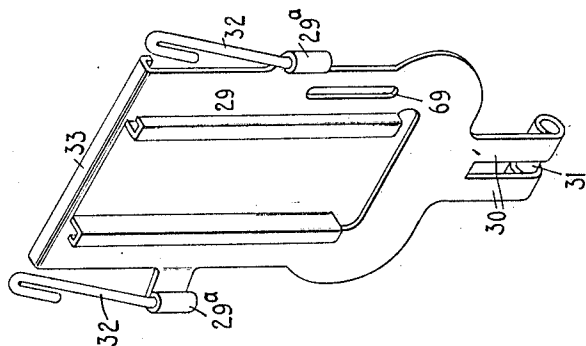


FIG. 7.

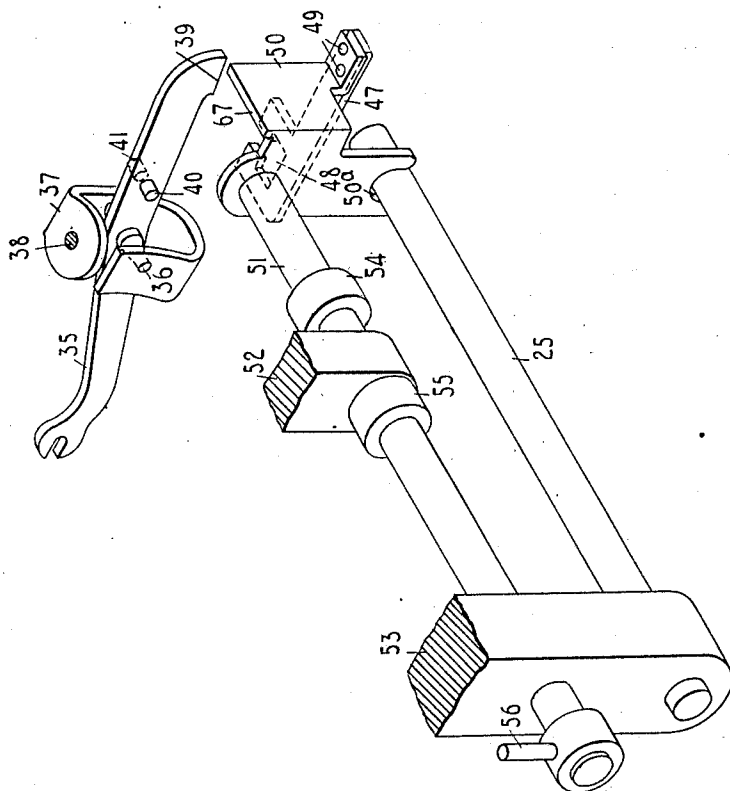


FIG. 6.

WITNESSES:

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M. H. Hannacher

INVENTOR:

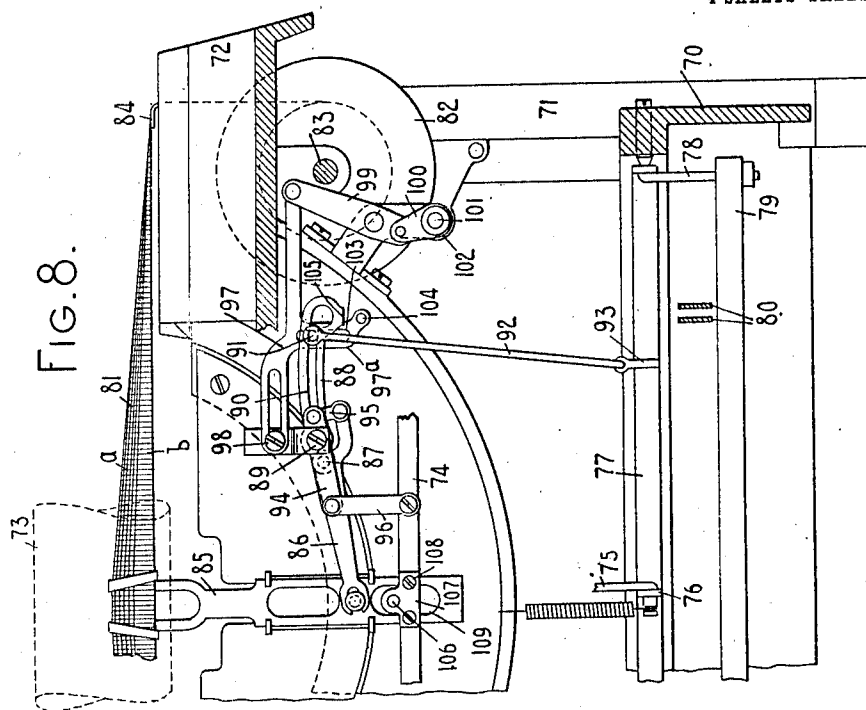
Morris M. Pool

By Jacob Feller

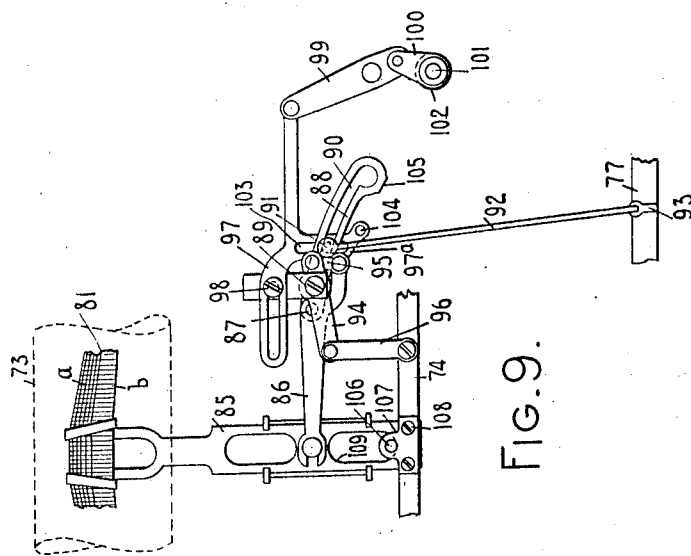
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1,040,405.

4 SHEETS--SHEET 4.



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9.6

WITNESSES:

E. M. Wells.

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INVENTOR:

Morris M. Pool

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UNITED STATES PATENT OFFICE.

MORRIS W. POOL, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

1,040,405.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed February 20, 1911. Serial No. 609,611.

To all whom it may concern:

Be it known that I, MORRIS W. POOL, a citizen of the United States, and resident of 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.

My invention relates to ribbon mechanism for typewriting machines and its object is to provide variable ribbon throwing or vibrating mechanism in combination with improved stop mechanism for said variable ribbon throwing mechanism.

Another object is to provide an improved construction of ribbon vibrator.

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

In prior constructions in which the ribbon throwing devices and the stop devices therefor have been simultaneously varied or re-set, it has been found difficult in practice to assemble the parts so as to provide for the accurate arresting of the throw-varying means both when it throws or vibrates the ribbon a short distance and when it throws it a greater distance. The difficulties of providing stop devices which act to give correct and accurate results at all times are increased when the devices are employed with a typewriting machine of the shifting platen style.

It is the chief purpose of my invention to obviate the difficulties and inaccuracies specified by providing in connection with the vibrating or ribbon throwing devices and the means for varying the same a plurality of separate stops, the one which limits the longer throw of the ribbon being fixed and immovable on the part which supports it so that it may be arranged or assembled in place with nicety and precision. The other stop which controls the short throw of the ribbon is movable into and out of action concurrently with and preferably automatically by the throw varying mechanism when it is set and re-set. It will be understood that when the short-throw stop is in operative position it will arrest the vibrator and its actuating means before the fixed or long-throw stop is

reached; but when the movable stop is thrown out then the vibrator and the actuating devices will when actuated move from normal position until arrested by the fixed stop.

Furthermore, in some prior constructions of vibrator the printing portion of the ribbon is apt to be thrown upward so that the top edge, instead of remaining in a straight line between the guides at the sides of the vibrator, will rise above such straight line so that the types may encroach from one ribbon field on the other. Accordingly I have provided a vibrator in which such overthrow of the ribbon is prevented by a roof or lip extending crosswise of the vibrator and controlling the top edge of the printing portion of the ribbon.

My invention will be more specifically described in connection with the accompanying drawings wherein—

Figure 1 is a fragmentary vertical sectional view of a Monarch front strike typewriting machine embodying one form of my invention, parts of the machine being omitted and broken away. Fig. 2 is a fragmentary face view of the ribbon vibrator, its support and the associate fixed stop. Fig. 3 is a vertical sectional view showing the vibrating lever, part of its actuating devices and part of the throw-varying and stop mechanisms. Fig. 4 is a fragmentary front view partly in section showing the operating lever and the upper part of the actuating link. Fig. 5 is a plan view of the hand controlled devices for setting the throw-varying means and changing the stops. Fig. 6 is a perspective view showing the ribbon vibrator operating lever and the movable stop devices associated therewith. Fig. 7 is a perspective view of a novel form of ribbon vibrator. Fig. 8 is a vertical sectional view seen from the rear and showing part of a No. 10 Remington front-strike typewriting machine embodying a modified form of my invention. Fig. 9 is a view corresponding to Fig. 10 but omitting some parts and showing other parts in different relationships.

Referring first to the construction shown in Figs. 1 to 7, inclusive, the frame of the machine comprises a base 1, corner posts 2 and a top plate 3 above which is supported a platen 4 diagrammatically illustrated, the platen being mounted in a traveling carrier

(not shown) which is connected by a band 5 with a spring drum 6 and controlled by escapement devices omitted from the drawing. Type bars 7 cooperate with the front face of the platen, said type bars being arranged in a segment of a circle and each being pivoted on a hanger 8 secured to a shiftable supporting segment 9. The type bars are each connected by a link 10 to a sub-lever 11 cooperating with a fixed abutment 12 and pivoted at 13 to a key lever 14 which is fulcrumed on a plate 15 in rear of the base and is provided with a restoring spring 16. A universal bar 17 underlies the key levers, said universal bar being mounted on a frame 18 which is pivoted at the sides of the base and underlies the universal bar to be swung downward by the key levers at printing operations. Ribbon spools 19, one of which is shown, are arranged horizontally above the top plate and forward of the platen, one at each side of the machine. Each ribbon spool is connected with a beveled pinion 20 which meshes with a pinion 21 at the forward end of a shaft 22, the rear end whereof carries a small beveled gear 23 which is adapted to mesh with a beveled gear 24 on a driving shaft 25 which is connected to turn with the spring drum during movements of the carriage in printing direction by devices comprising beveled gears 26 and 27. The driving or power shaft 25 is adapted to be moved back and forth endwise to connect the ribbon spools in alternation with the spring drum and thus feed the ribbon back and forth longitudinally. A ribbon 28 provided with longitudinal printing fields *a* and *b* of different characteristics or colors is wound on the ribbon spools 19 and midway between said spools is threaded through a vibratory ribbon carrier or vibrator which comprises parallel vertical portions 29 which are joined at their lower ends and terminate in a slotted stem 30 provided with a cross pin 31. The vertical portions 29 have lateral lugs 29^a from which rise wires 32. The upper ends of the vertical portions are joined by a trough-like cross bar 33 best shown in Fig. 7, the cross bar in cross section resembling a shallow inverted U. The upper edge of the printing portion of the ribbon 28 is located within said trough-like portion or curved lip or ledge 33 (Fig. 3) and is prevented thereby from rising or departing from a horizontal straight line. The inner edges of the vertical portions 29 are bent to provide grooves which embrace the inwardly bent vertical portions of a plate-like support 34 and guide 34 suitably secured to the frame of the machine. The guide 34 *per se* is the invention of another. The cross pin 31 is engaged by the slotted forward end of an operating lever 35 which projects through a slot 34^a in the vibrator guide 34 and has

a fulcrum pin 36 bearing in a bracket 37 secured to the under side of the top plate 3 by a screw 38 (Fig. 6). The rear arm of the operating lever terminates in a stop face 39 and between said stop face and the fulcrum 36 is provided with oppositely disposed lateral studs or cross pins 40 and 41 which cooperate with an actuating link 42 pivotally connected at its lower end to an arm 43 on the universal bar 18 (Fig. 1) and bifurcated at its upper end to provide forks 44. The studs may be comprised in a single pin driven through the lever. The left-hand fork as clearly shown in Fig. 4 is formed with a round hole 45 and its right-hand fork is formed with a vertical slot 46. By swinging the link 42 side-wise back and forth about its pivotal connection, the openings 45 and 46 may be caused to engage in alternation with the studs 41 and 40 respectively, thus connecting the link with the operating lever closely as when the round hole 45 embraces the stud 41, or loosely, so as to give a lost motion connection, as when the slot 46 cooperates with the stud 40. The swinging movements of the link 42 are controlled by hand operated devices comprising a horizontal plate 47 which, as shown in Fig. 6, is provided with a slot 48 in which the stem of the forked portion of the link 42 engages. The plate 47 is screwed at 49 to an angular slidable bracket or support 50 which is secured at the inner end of a slide rod 51, said slide rod bearing in lugs 52 and 53, depending from the top plate, the lug 53 being the right-hand bearing of the ribbon driving shaft 25. Collars 54 and 55 fixed to the slide rod 51 cooperate with the sides of the lug 52 to limit endwise movements of said slide rod. Such movements are controlled by devices which cooperate with a vertical pin 56 secured to the outer end of the slide rod, said devices comprising a bell crank 57 having a fixed pivot 58 and connected by a forwardly extending link 59 with a second bell crank 60 having a fixed pivot 61. The bell crank 60 has a forwardly extending spring arm 62 which projects through the right-hand cover plate 63 and terminates in a finger piece or key 64. The spring arm is provided with a tooth 65 which is adapted to engage notches 66 in the upper edge of the front plate 63, in order to hold the bell crank 60, and the train of mechanism connected therewith down to and including the actuating link 42, in predetermined positions. The lower end of the slidable support 50 is cut out at 50^a to partly embrace the driving shaft 25 so as to give stability to the support. It will be understood that by sliding the support in and out, the forked actuating link 42 is positioned to cooperate with one or another of the studs 40 and 41, the key

hole slot 48 permitting the link to be vibrated up and down so as to transmit movements of the universal bar to the operating lever and ribbon vibrator and ribbon during printing operations. The upper edge 67 of the slidable support is horizontal and is interposed in the path of the stop face 39 when the support 50 is slid in so as to engage the slot 46 with the stud 40. This engagement, because of the lost motion, will give the least extent of movement to the operating lever and will raise the vibrator only far enough to present the upper ribbon field *a* to the types when the actuating link 42 is operated from the printing keys. Said actuations of the operating lever will be limited by the engagement of the stop 39 with the edge 67 which thus serves as a stop to limit the upward movement of the vibrator when the upper ribbon field is in use, thus preventing overthrow and confining the printing to the upper ribbon field.

Various features of the throw varying and stop mechanism as thus far described form in part the subject-matter of the pending application of Edward E. Barney, Serial No. 324,956, filed July 16, 1906. The present construction differs from that shown in the application aforesaid in that only one movable frame stop 67 is provided. When said stop is moved out of action the path of the stop 39 is entirely unobstructed, whereas in the prior construction when the frame stop corresponding to 67 is moved out of position a second frame stop is moved into position to co-act with the operating lever. In the present construction, instead of a second movable frame stop, I provide a fixed frame stop which always occupies the same position but which is brought into use only when the frame stop 67 has been moved to inoperative position. The second frame stop in the present instance is a stud or pin 68 which is fixed to and projects rearward from the right-hand side portion of the upright vibrator guide 34 (Figs. 2 and 3). The stud 68 passes rearward through and beyond a vertical slot 69 cut in the right-hand vertical portion 29 of the vibrator. Preferably the upper end of the slot 69 rests on the stud 68 as shown in Fig. 2 when the vibrator is in normal position, thus providing stop devices to determine the arrest of the vibrator as it moves downward from printing position. The length of the slot 69 is such that when the operating lever 35 and actuating link 42 are engaged as shown in Fig. 4 and the operating lever has been actuated until arrested by the engagement of the stop 39 with the slidable frame stop 67 as shown in Fig. 3, then the vibrator will have been moved upward and arrested before the lower end of the slot 69 has reached the stop 68. In other words, the stop 68 and the cooperating stop formed

by the lower closed end of the slot 69 will be ineffective or inoperative when the stops 67 and 39 are co-active. Suppose, however, the stop 67 is moved rightward out of operation and concurrently the actuating link is swung transversely of the operating lever so as to disengage from the stud 40 and to engage closely with the stud 41 through the round hole 45. Then at printing operation a greater extent of upward movement will be communicated to the operating lever 34 from the actuating link and the vibrator will be raised to present the lower ribbon field *b* to the types. The upward movement of the vibrator will continue until it is arrested by the engagement of the lower closed end of the slot 69 with the stop 68 and this engagement will take place before the lower edge of the printing field *b* can have passed the printing point. In other words, the stops 68 and 69 will co-act to limit the movement of the vibrator so as to restrict the printing to the printing field *b* of the ribbon.

The principles of my invention may be employed in connection with other machines beside the Monarch typewriter illustrated in Figs. 1 to 7 and to make this clear I have, in Figs. 8 and 9, illustrated my invention as embodied in a No. 10 Remington front-strike typewriting machine. As shown, said Remington machine comprises a base 70, corner posts 71 and a top plate 72. A platen 73 diagrammatically illustrated is mounted on the carriage (not shown) comprising a truck and a shiftable platform frame, the shifting movements of the platen frame being controlled by devices which comprise a shift bar 74. The printing movements of the platen and carriage are controlled by escapement devices (not shown) which are connected through a link 75 with a crank arm 76 on a rock shaft 77 connected by links 78 with a universal bar 79 which underlies the key levers 80. A ribbon 81 having printing fields *a* and *b* of different characteristics is wound upon ribbon spools, one of which is shown and numbered 82, the ribbon spools being arranged beneath the top plate on shafts 83 and the ribbon being guided upward over guides 84 and inward along the front face of the platen. The ribbon spools, as is well understood, are adapted to be driven in alternation to feed the ribbon lengthwise back and forth. Midway between the ribbon spools the ribbon is threaded through slots in a ribbon vibrator 85 which is controlled by a two-part operating lever, one lever part 86 being pivotally connected with the vibrator, said part 86 being pivotally supported at 87 on the other lever part 88 which has a fixed fulcrum 89. The lever part 88 is formed with a longitudinal slot 90 which receives an actuating stud 91 fixed to the top of an actuating link 92 piv-

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oted at its lower end to a crank arm 93 on the rock shaft 77. When said rock shaft is rocked by the universal bar the link 92 will be drawn down and will operate the two lever parts 86 and 88 as a single lever, said single lever raising the vibrator and presenting the ribbon in the path of the types. The lever parts 86 and 88 are maintained in proper relationship by devices comprising a lever 94 connected at one end by a link 95 to the lever part 86 and at the opposite end by an arm 96 to the shift bar 74 to which said arm 96 is secured. As is well understood the construction is such that when the platen is shifted upward the shift bar 74 will operate through the arm 96, lever 94 and link 95 to turn the lever part 86 on its fulcrum 87 so as to correspondingly shift the vibrator and ribbon with the platen. This shifting operation of the lever part 86 and the vibrator 85 will not affect the lever part 88 which has a single normal position. Means are provided for switching the actuating stud 91 to different points along the slot 90 so as to vary the extent of throw imparted to the vibrator at printing operation. Said means comprise a slotted shiftable frame 97 guided by a fixed screw 98 and controlled at the front of the machine by devices comprising a lever 99 pivotally connected to the tail of the shiftable frame and also to a crank arm 100 fixed to the rear end of a rock shaft 101, the forward end of which is provided with a finger or key 102 by which the rock shaft may be turned in its bearings to slide the shift frame laterally toward and away from the vibrator. The shift frame is provided with a downward extension 97^a formed with a vertical slot 103 in which the stud 91 engages, so that said stud is shifted toward and away from the fulcrum 89 by the shift frame. When the stud and the shift frame are in the position shown in Fig. 8 the vibrator will be raised at printing operation so as to present the upper field *a* to the types. When the shift frame is shifted to the Fig. 9 position the stud 91 will be moved in toward the fulcrum 89 so that at printing operation the vibrator will be lifted to a greater extent and will present the lower ribbon field *b* to the types. The construction as thus far described is common to the No. 10 Remington machine. My improvements contemplate the provision of a shiftable frame stop in the form of a stud 104 projecting from the extension 97^a of the shift frame and lying in the path of a stop face 105 on the lever part 88 when the shift frame is in the Fig. 8 position. At this time if a printing key be operated and the link 92 pulled down to operate the lever 86, 88, and vibrator, said lever will be arrested by the contact of the stop 105 with the stop 104 when the vibrator has been raised to present the upper field *a* to the types the positive arrest of the parts

taking place before the field *a* has been lifted past the printing point. The result is that accidental printing on the lower field *b* will be prevented by said stops. When the shift frame 97 is shifted to the Fig. 9 position the shiftable frame stop 104 will be shifted out of the path of the stop 105 and the path of the operating lever will be unobstructed. But at this time the vibrator will be arrested when it has been lifted far enough to present the lower field *b* to the types by a frame stop or stud 106 which is supported on a plate 107 screwed at 108 to the shift frame 74. The stud or stop 106 is adapted to contact with the closed lower end of a slot 109 formed in the lower end of the vibrator 85. The construction is such that when the shiftable frame stop 104 is in operative position it will arrest the operating lever before said lever has lifted the vibrator far enough to bring the bottom of the slot 109 against the stop 106. In other words, the stop devices 106 and 109 will be inoperative when the stops 104 and 105 are operative. But the shifting out of co-active relationship of the latter pair of stops will render effective the stops 106 and 109. It will be understood that the stops 104 and 105 will not be affected when the platen is shifted to change case. Further it will be understood that the stops 106 and 109 will both be shifted when the platen is shifted, but the shift of the two stops will correspond in extent and their mutual relationship will not be altered, remaining the same in upper case as in lower case position.

In both described constructions, it will be observed that two sets of stop devices are provided; that each set coöperates with the actuating mechanism of the ribbon vibrator to positively arrest the vibrator and ribbon at a predetermined point; that one of the sets is combined with the throw changing devices so that the stops of said set are relatively movable with respect to each other automatically through the operation of the throw changing mechanism; that one of said relatively movable stops is a shiftable frame stop; that the set of stops comprising the shiftable frame stop may be said to be interposed between the stop members of the other set, since they prevent the members of said other set from co-acting, such co-action only taking place after the withdrawal from co-active relationship of the set comprising the shiftable frame stop; and that the set for arresting the vibrator after it has received its greatest extent of movement comprises a stop member which may be called a fixed frame stop in contradistinction from a frame stop which is shiftable into and out of action.

It will be observed in the Figs. 8—9 form of my invention the fixed frame stop 106 is mounted on platen shifting devices so that

it shifts with the platen, but its relationship with its co-acting stop is not thereby altered; that in both instances the fixed frame stop co-acts directly with the ribbon

5 vibrator while the shifting frame stop co-acts with the operating lever, the operating lever in both forms of the invention being arrested by one pair or set of stops before the other pair can engage, although one of
10 said other pair is always in the path of the other so that they will engage whenever the first or co-acting stops are withdrawn from action so as to permit further advance of the operating lever.

15 Various changes may be made without departing from my invention.

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

1. In a typewriting machine, the combination with ribbon vibrating devices settable at
20 will to give a plurality of different extents of vibration to the ribbon, of ribbon stop devices, certain of said stop devices coöperating with said vibrating devices for each extent
25 of throw of the ribbon, the ribbon stops for a short throw of the ribbon being interposed to prevent by their prior co-action co-operative engagement between the ribbon stops for a longer throw.

30 2. In a typewriting machine, the combination with ribbon vibrating devices settable at will to give a plurality of different extents
35 of vibration to the ribbon, of ribbon stop devices, certain of said stop devices coöperating with said vibrating devices for each extent of throw of the ribbon, the ribbon stops
40 for a short throw of the ribbon being interposed to prevent coöperation between the ribbon stops for a longer throw and being settable independently of the stops for the longer throw.

3. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
45 devices settable to give different extents of throw to the vibrator, and a plurality of sets of stops for arresting the vibrator, said sets being independently settable.

4. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
50 devices settable to give different extents of throw to the vibrator, and a plurality of sets of stops for arresting the vibrator, each set comprising two members that co-act to limit the throw of the vibrator to one of a
55 plurality of predetermined extents.

5. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
60 devices settable to give different extents of throw to the vibrator, and a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw, the members constituting one of said sets having at all times an unvarying normal relationship.

6. In a typewriting machine, the combination

of a ribbon vibrator, vibrator actuating devices settable to give different extents
70 of throw to the vibrator, and a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw, the members constituting one of said sets having an unvarying normal relationship and the members constituting the other set having a variable normal relationship.

7. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
75 devices settable to give different extents of throw to the vibrator, a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw, and means for relatively moving the members of one set without moving the members of the other set.

8. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
85 devices settable to give different extents of throw to the vibrator, a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw, and means for relatively moving the members of one
90 set without moving the members of a second set, but the members of said second set being rendered effective by the relative movement between the members of the first set.

9. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
95 devices settable to give different extents of throw to the vibrator, a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw, and means for relatively moving the members of one set to render co-active the members of another set.

10. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
105 devices settable to give different extents of throw to the vibrator, and a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw of said vibrator, each set comprising a frame
110 stop and a co-acting stop on the train of devices operative to vibrate the ribbon.

11. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating
115 devices settable to give different extents of throw to the vibrator, a plurality of sets of stops for arresting the vibrator, each set coöperating for one extent of throw of said vibrator, each set comprising a frame stop
120 and a co-acting stop on the train of devices operative to vibrate the ribbon, and means for shifting one only of said frame stops to change its normal relationship with its co-acting stop, the other frame stop having an
125 unvarying normal relationship with its co-acting stop.

12. In a typewriting machine, the combination with ribbon vibrating devices settable
130 at will to give a plurality of different ex-

tents of vibration to the ribbon, of ribbon stop devices, certain of said stop devices co-operating with said vibrating devices for each extent of throw of the ribbon, the ribbon stops for one extent of vibrating movement being settable independently of the stops for another and different extent of vibrating movement.

13. In a typewriting machine, the combination of a ribbon vibrator, actuating devices therefor, a stop on one of said actuating devices, a co-acting frame stop, a second frame stop, a stop on the vibrator co-active with said second frame stop, and means for rendering said sets of stops operative at will.

14. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating devices, key controlled means for setting said actuating devices to give different extents of throw to the vibrator, a plurality of sets of stop devices, each set composed of two separate members co-operating for one extent of throw of the vibrator, and means for rendering said sets of stop devices alternately co-active.

15. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating devices, key controlled means for setting said actuating devices to give different extents of throw to the vibrator, a plurality of sets of stop devices, each set comprising two separate devices co-operating for one extent of throw of the vibrator, and means for automatically rendering said sets of stop devices alternately co-active.

16. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating devices, key controlled means for setting said actuating devices to give different extents of throw to the vibrator, a plurality of sets of stop devices, each set co-operating for one extent of throw of the vibrator, and means automatically operating to change the normal relationship between the members constituting one only of said sets of stops.

17. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating devices, key controlled means for setting said actuating devices to give different extents of throw to the vibrator, a plurality of separate sets of stop devices, each set co-operating for one extent of throw of the vibrator, and means connected with said key controlled means for moving one of said sets of stops into and out of co-active relationship.

18. In a typewriting machine, the combination of a ribbon vibrator, vibrator actuating devices, key controlled means for setting said actuating devices to give different extents of throw to the vibrator, a plurality of sets of stop devices, each set co-operating for one extent of throw of the vibrator, and means connected with said key con-

trolled means for moving one of said sets of stops into and out of co-active relationship, the normal relationship between the other set of stops remaining always the same.

19. In a typewriting machine, the combination of a ribbon vibrator, actuating devices therefor comprising an operating lever and an actuating link, means for shifting said link to change the throw imparted to the vibrator, a stop co-operative with said lever and controlled by said means, and a stop immovable by said means but rendered operative thereby.

20. In a typewriting machine, the combination of a ribbon vibrator, actuating devices therefor comprising an operating lever and an actuating link, means including a hand controlled shift frame for shifting said link to change the throw imparted to the vibrator, a stop on said shift frame co-operative with the stop on said operating lever, and a relatively fixed stop co-operative with said vibrator, said relatively fixed stop coming into play when the stop on said shift frame is moved out of use.

21. In a typewriting machine, the combination of a shiftable platen, ribbon actuating means for a ribbon which shifts with said platen, means for varying said actuating means to change the throw imparted to the ribbon, and stop devices co-operative to arrest the ribbon at the end of different extents of throw, certain of said stop devices being shiftable with the platen.

22. In a typewriting machine, the combination of a shiftable platen, ribbon actuating means for a ribbon which shifts with said platen, means for varying said actuating means to change the throw imparted to the ribbon, and sets of stop devices, each set comprising two members co-operative to limit one extent of throw of the ribbon, the stop members of one of said sets being shiftable with the platen.

23. In a typewriting machine, the combination of a shiftable platen, ribbon actuating means for a ribbon which shifts with said platen, means for varying said actuating means to change the throw imparted to the ribbon, sets of stop devices, each set comprising two members co-operative to limit one extent of throw of the ribbon, the stop members of one of said sets being shiftable with the platen, and the stop members of another set being independent of the platen shift.

24. In a typewriting machine, the combination of a shiftable platen, ribbon actuating means for a ribbon which shifts with said platen, means for varying said actuating means to change the throw imparted to the ribbon, sets of stop devices, each set comprising two members co-operative to limit one extent of throw of the ribbon, the stop

members of one of said sets being shiftable with the platen and the stop members of another set being independent of the platen shift, and means for changing the normal relationship between the members of the last named set of stops.

25. In a typewriting machine, the combination of a shiftable platen, ribbon actuating means for a ribbon which shifts with said platen, means for varying said actuating means to change the throw imparted to the ribbon, sets of stop devices, each set comprising two members coöperative to limit one extent of throw of the ribbon, the stop members of one of said sets being shiftable with the platen and the stop members of another set being independent of the platen shift, and means for changing the normal relationship between the members of the last named set of stops, the stop members shift-

able with the platen having an unvarying normal relationship.

26. A ribbon vibrator for typewriting machines comprising upright parallel parts, and a roof joining said parallel parts and housing the top edge of the ribbon.

27. A ribbon vibrator for typewriting machines comprising parallel parts, and a trough-like connection joining said parallel parts at their tops, the upper edge portion of the ribbon being retained within said trough-like connection.

Signed in the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 18th day of February, A. D. 1911.

MORRIS W. POOL.

Witnesses:

M. F. HANNWEBER,
E. M. WELLS.

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