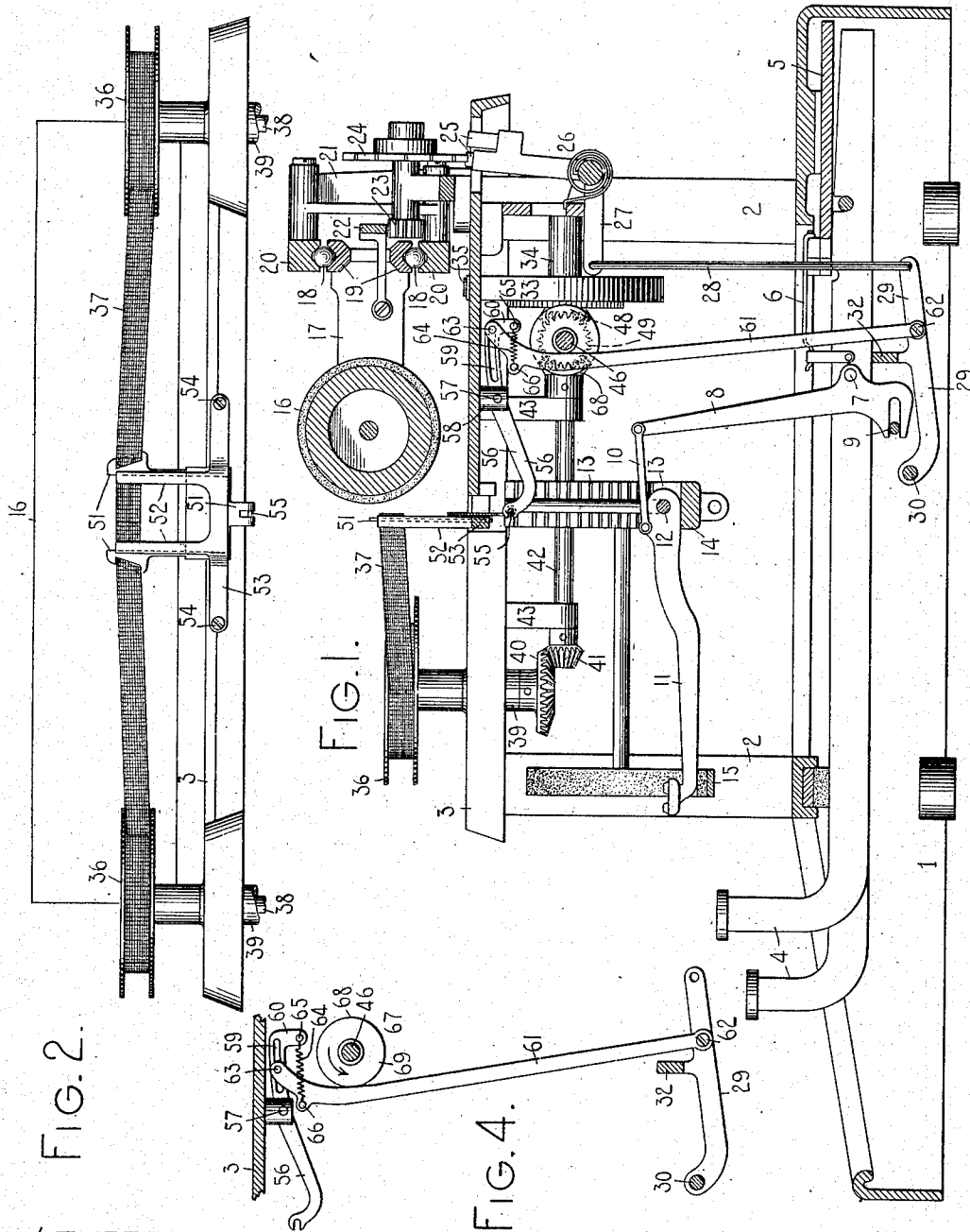


947,257.

M. W. POOL.
TYPE WRITING MACHINE.
APPLICATION FILED FEB. 27, 1905.

Patented Jan. 25, 1910.

3 SHEETS—SHEET 1.



WITNESSES:

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3 SHEETS—SHEET 2.

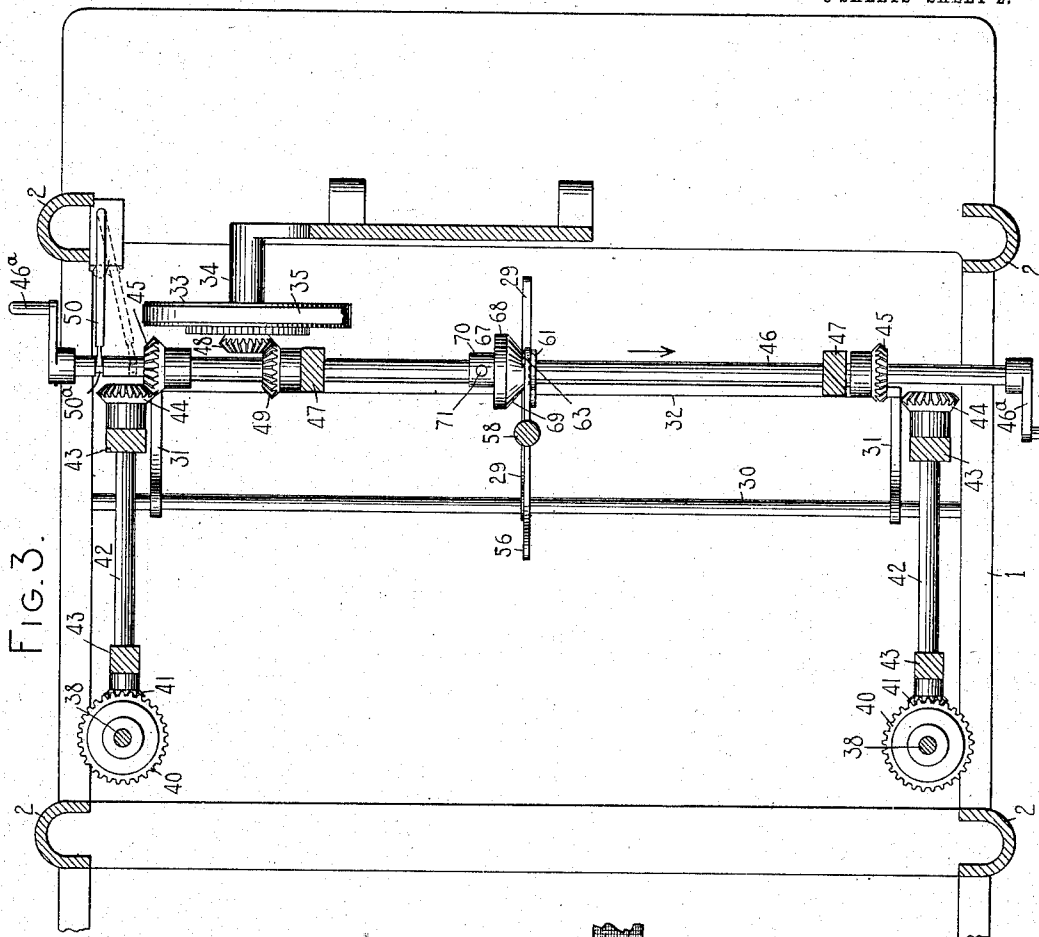


FIG. 3.

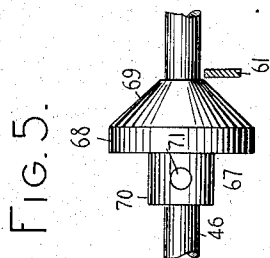


FIG. 5.



FIG. 7.

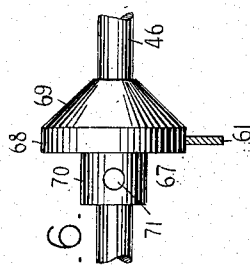


FIG. 6.

WITNESSES.

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UNITED STATES PATENT OFFICE.

MORRIS W. POOL, OF NEW YORK, N. Y., ASSIGNOR TO THE MONARCH TYPEWRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

947,257.

Specification of Letters Patent.

Patented Jan. 25, 1910.

Application filed February 27, 1905. Serial No. 247,474.

To all whom it may concern:

Be it known that I, MORRIS W. POOL, 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 more particularly to the ribbon feed mechanism of "visible writing" machines, by which term is meant those machines wherein the writing is visible to the operator as it is written. In machines of this class employing a ribbon, the latter is usually controlled by a reciprocatory ribbon carrier or vibrator which term, as herein employed, comprehends any device for moving the ribbon automatically to cover the printing point and for affording a movement of the ribbon to uncover the printing point. In constructions in which the vibrator has a uniform throw the type impressions will follow a straight line lengthwise of the ribbon.

The main object of my invention is to provide means to vary widthwise as well as lengthwise the portion or printing field of the ribbon exposed to the types, as by causing the type impressions to follow a plurality of predetermined paths longitudinal of the ribbon and parallel with each other and thereby to more thoroughly and completely exhaust the inking surface.

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

In the accompanying drawings, Figure 1 is a vertical front to rear sectional view, taken about centrally, of one form of type-writing machine embodying my invention, parts of the machine being omitted. Fig. 2 is a fragmentary front elevation of the upper part of the machine. Fig. 3 is a fragmentary top plan view of the machine with the top plate thereof removed or sectioned away, the parts being positioned as in Fig. 1. Fig. 4 is a side elevation showing parts of the ribbon mechanism, some of said parts being in different positions from those in which they appear in Fig. 1. Fig. 5 is an enlarged top plan view of some of the ele-

ments of the ribbon mechanism, positioned as in Figs. 1 and 3. Fig. 6 is a view similar to Fig. 5 but showing the parts positioned as in Fig. 4. Fig. 7 is an enlarged diagrammatic view showing the paths of the type impressions on the ribbon. Figs. 8, 9 and 10 are diagrammatic views illustrating the automatic ribbon reversing mechanism.

Considering first Figs. 1 to 7, inclusive, 1 designates the base of the machine, 2, corner posts, and 3, a top plate. Key levers 4 are fulcrumed on a fulcrum plate 5, each key lever being provided with a restoring spring 6. Pivottally connected with each key lever at 7 is a sub-lever 8, the lower portion whereof co-acts with a fixed abutment 9 and the upper end whereof is connected by a link 10 with a type bar 11. The said type bar is one of a segmentally arranged series fulcrumed on a curved fulcrum wire 12. Each bar may be guided in a radial slot 13 formed in a segmental type bar support 14. Instead of the construction herein shown, the type bars may be provided with other styles of pivots and hangers as desired. The type bar segment illustrated is of the shifting variety and is designed to be shifted for changing case by a known construction of shifting mechanism. It is immaterial, however, for the purposes of this invention whether the segment shifts or whether it is of the non-shifting variety or kind. The type bars 11 are normally supported by a rest 15 and are designed to coöperate with a platen 16 mounted in a carriage 17, the latter being supported and guided by anti-friction balls 18 which are confined between grooved carriage rails 19 and oppositely grooved rails 20, the latter being secured to brackets or standards 21 fixed to the top plate of the machine. The carriage 17 is provided with a rack 22 which coöperates with a pinion 23, said pinion being operatively connected with an escapement wheel 24. Feed dogs 25 are adapted to coöperate with the escapement wheel 24, said feed dogs being mounted in a pivoted dog carrier or rocker 26, the horizontal arm 27 whereof is connected by a link 28 with an arm 29 projecting rearwardly from the central part of a pivot rod 30 which is supported in the side frames of the machine. Near its ends the pivot rod 30 is provided with rearwardly projecting side arms 31, which, together with the arm 29, support a universal bar 32, the

latter extending from side to side of the machine beneath the series of key levers and the spacing levers (not shown), and being designed to be swung downward about its pivot 30 whenever any of said levers are depressed during the operation of the machine. A spring drum 33, pivoted at 34 to a fixed part of the machine, is connected by a strap 35 with the carriage 17 and tends constantly to draw said carriage leftward across the top plate. Whenever the universal bar is depressed the feed dogs 25, cooperating with the other escapement members in a known manner, permit the carriage to move one letter space to the left.

Ribbon spools 36 are pivotally mounted above the top plate of the machine, one at each side thereof and forwardly of the platen. A ribbon 37 is wound upon said spools and passes from one to the other in front of the platen. Each ribbon spool is secured at the upper end of a vertical shaft 38 which rotates in a fixed bearing 39, said shaft being provided at its lower end with a small beveled gear 40. Meshing with the beveled gear 40 is a beveled pinion 41 secured to the forward end of a horizontally disposed shaft 42 adapted to rotate in fixed bearings 43, and having fixedly secured to its rear end a beveled pinion 44. Adapted to cooperate with the pinion 44 is a driving pinion 45 fixedly secured on a driving or power shaft 46 which extends from side to side of the machine beneath the top plate and is slidably mounted in fixed bearings 47. The driving shaft 46 is connected with and is caused to rotate by the spring drum 33 through beveled pinions 48 and 49, the first named pinion being caused to rotate with the spring drum when the latter draws the carriage leftward, and the pinion 49 being so connected with the driving or power shaft 46 that the latter is caused to rotate with said pinion but has endwise motion independently thereof.

It will be understood that each ribbon spool is connected as above described with a beveled pinion 44, there being one of the latter at each side of the machine as seen in Fig. 3. The beveled driving pinions 45 are so arranged upon the power shaft 46 that only one of said driving pinions is engaged at a time with its associate pinion 44. To accomplish the alternate engagement of the driving pinions 45 with their respective associate pinions 44 and thereby to cause the ribbon to wind from one spool to the other and vice versa, the power shaft 46 is moved endwise in any known manner. The preferred means of causing this endwise movement of the driving shaft is that shown in the U. S. patent of Jacob Felbel and Carl Gabrielson No. 703,339, dated June 24, 1902, and hereinafter briefly described. With the parts arranged as shown in Fig. 3 of the

drawings of this application, the ribbon may be caused to wind upon the left-hand ribbon spool and wind off the right-hand spool by means such as those explained in the above cited patent. When all the ribbon has been wound off the right hand ribbon spool, the shaft 46 may, by the means explained in said patent, be shifted longitudinally in the direction of the arrow in Fig. 3 so as to cause the right-hand driving pinion 45 to engage with its pinion 44 and the left-hand driving pinion 45 to disengage from its associate pinion. The direction of the longitudinal feed of the ribbon is thereby reversed and the latter is caused to wind on the right-hand spool and off the left-hand spool. I do not, however, desire to be limited to the means for reversing the ribbon winding or longitudinal feed mechanism explained in said patent. Any other automatic reversing means may be used with my invention, or the ribbon may be manually reversed as by pulling or pushing the handles 46^a secured to the ends of the driving or power shaft 46 and ordinarily employed for rapidly winding the ribbon. A pivoted, vibratory, spring-pressed detent 50, engaging with a circumferential depression 50^a in the power shaft 46, serves to retain the latter in either of its working positions, and has the additional function of assisting to shift said shaft from one working position to the other.

Centrally of the machine the ribbon is threaded through a ribbon vibrator or reciprocatory carrier 51 which is guided and supported in grooves in the upright arms 52 of a supporting bracket 53 secured to the frame of the machine by screws 54. The lower end of the vibrator 51 is bifurcated and is provided with a cross-pin 55 which engages the slotted forward arm of an operating lever 56 fulcrumed at 57 in a lug 58 depending from the under side of the top plate. The rear arm of the operating lever 56 is formed with a slot 59 and terminates in a depending portion 60. An actuating link 61 is pivotally connected at 62 with the arm 29 of the universal bar frame and is provided at its upper end with a projecting stud 63 which engages with the slot 59 in the operating lever. A horizontally disposed spiral spring 64, connected at its rear end to a pin 65 in the part 60 of the operating lever and connected at its forward end to a pin 66 in the link 61, tends constantly to draw said link rearwardly about its pivot 62 and to maintain the stud 63 at the rear end of the slot 59 (Fig. 1). It will be noted from an inspection of Figs. 1 and 5 that the rear edge of the link 61 is close to but does not contact with the driving shaft 46 when the pin 63 is at the rear of the slot 59.

Mounted on the driving or power shaft 46 is a switching member or link shifter 67,

which, as herein shown, comprises a circular face 68 concentric with the shaft 46, a cone portion 69 and a sleeve portion 70. The smaller end or top of the cone portion 69 terminates a short distance from the shaft 46. When the parts are arranged as shown in Fig. 3, the end or top of the cone 69 is slightly to the left of the link 61. The sleeve portion 70 is perforated to receive a set screw 71 by which the switching member 67 is fixedly connected with the power shaft 46. Any other suitable means may be employed for so connecting the member 67 and the power shaft.

When the parts are positioned as shown in Figs. 1, 3 and 5, the link 61, engaging with the operating lever 56, as far as possible from its fulcrum 57, will tend to move the forward end of the operating lever upward, when a key lever 4 is adequately depressed, until the ribbon covers the printing point. Whenever in the claims I have stated that the vibrator or carrier is moved or thrown to the printing point, I desire to be understood as meaning that the vibrator is moved so as to cause the ribbon to cover the printing point on the platen. With the parts arranged as in said Figs. 1, 3 and 5, the throw of the ribbon vibrator is a constant one and the mechanism is so proportioned and adjusted that the type impressions will follow a path lengthwise of the ribbon and indicated by the dotted line *a* (Fig. 7). The types will ordinarily contact with the ribbon along the path *a* until the right-hand ribbon spool is empty. When the ribbon has been completely unwound from the right-hand spool, the power shaft 46 is shifted longitudinally in the direction of the arrow in Fig. 3 in a manner heretofore referred to, until the right-hand beveled gears 45 and 44 are in mesh and the corresponding left-hand gears are out of mesh, thereby reversing the longitudinal feed of the ribbon and causing the latter to wind on the right-hand spool and off the left-hand spool. As the shaft 46 moves in the direction of the arrow in Fig. 3, the shifting member 67 moves with the shaft and the cone 69 will contact with the rear edge of the link 61 and will swing the latter forwardly about its pivot 62 against the pull of the spring 64. The parts are so proportioned and arranged that when the shifting member has reached the limit of its movement in the direction of the arrow (Fig. 3) the link 61 will have been cammed or swung forward from the position shown in Figs. 1 and 5 so as to engage with the circular face 68 of the switching member as indicated in Figs. 4 and 6. It will be noted from an inspection of said Fig. 4 that the forward swing of the link 61 moves the stud 63 forward in the slot 59 nearer the fulcrum 57 of the operating lever so that when the

forward end of said lever is swung upward during a printing operation in a manner heretofore explained, it will carry the ribbon to a greater height than when the stud 63 is at the rear of the slot 59. As the printing keys are operated the switching or shifting member 67 will rotate with the power shaft 46 and the circular face 68 will turn in contact with the rear edge of the actuating link. The stud 63 of the latter will thereby be maintained at the distance from the fulcrum 57 of the operating lever indicated in Fig. 4, and the forward arm of the lever will be swung upward at printing operation so as to present the lower portion of the ribbon to the types. The path of the type impressions will be in a straight line longitudinal of the ribbon and below and parallel with the path *a*. The lower path is represented by the letter *b* (Fig. 7). If the relations of the parts be left unchanged the type impressions will follow the path *b* until the ribbon has been completely unwound from the left-hand ribbon spool, after which the shaft 46 will be moved back longitudinally to the first described position with the left-hand pinions 44 and 45 in engagement and the longitudinal feed of the ribbon will be again reversed. The switching member 67 returns with the power shaft, and as it does so the draw spring 64 will swing the link 63 rearwardly about its pivot until said link reaches the position shown in Figs. 1, 3 and 5. With the link in this position, the type impressions will again follow the path *a*.

In order not to complicate the description of the invention proper, I have not hitherto described the means employed for automatically reversing the longitudinal feed of the ribbon. The preferred means is explained in detail in the patent to Felbel and Gabrielson No. 703,339, hereinbefore referred to, and it is thought sufficient at this time to explain the reversing mechanism briefly, reference being had to the said patent for a fuller description.

Referring now to Figs. 8, 9 and 10 of the drawings of the present application, 72 designates an elbow lever pivoted to the under side of the right-hand ribbon spool 36 and for the greater part of the time retained in the position indicated in Fig. 9 by folds of the ribbon 37, which it will be noted is winding off the right-hand spool and on the left-hand spool, the parts being positioned as indicated in Fig. 8. Until the right-hand spool is emptied the horizontal arm of the elbow lever 72 serves to retain in non-working position a cam plate 73 slidably secured to the under side of the spool 36. When the ribbon has been completely unwound from the spool it releases the upright arm of the elbow lever 72, thereby permitting the cam plate to slide vertically down-

ward to the position indicated in Fig. 10, in which position the outer cam surface 74 is adapted to engage with an upright pin 75 secured at one end of a horizontal spring mounted lever 76, the other end whereof normally contacts with and presses rearward the upright arm 77 of a spring mounted slide rod 78. The rear end of the slide rod is bent and terminates in a trip pin 79, which normally is opposite to, but out of mesh with, a worm 80 fixedly secured to the driving shaft 46. As the ribbon spool continues to rotate after the cam plate 73 drops to operative position, the cam face 74 acting upon the pin 75 cams the horizontal lever 76 against the pressure of its spring 76^a to the position indicated in Fig. 8, thereby allowing the slide rod 78 to be moved forward by its spring 78^a until the trip pin 79 engages with the worm 80. After this engagement takes place the driving shaft 46, as it is rotated during the operation of the machine, will be wormed along in the direction of the arrow in Fig. 8 until the right-hand driving pinion 45 meshes with its associate pinion 44 and the corresponding left-hand pinions disengage, thereby reversing the longitudinal feed of the ribbon. As the ribbon begins to wind back on the right-hand spool, it will press the upright arm of the elbow lever 72 against the spool core, restoring said lever, and with it the cam plate 73, to the position indicated in Fig. 9. When the cam plate 73 is moved upward it releases the horizontal lever 76, permitting the latter to again act upon the slide rod 78 to push said slide rod rearwardly and to restore the trip pin 79 to non-working position, the spring 76^a being strong enough to overcome the spring 78^a. It will be understood that the left-hand ribbon spool is provided with a similar train of mechanism which will operate in a similar manner when the said spool is emptied of the ribbon.

It will be noted that by my present invention I provide means for throwing the ribbon vibrator any one of a number of predetermined distinct and separate distances so that a type will strike at one of a number of predetermined, distinct points in the width of the ribbon. Consequently the type impressions will follow a path first along one portion of the ribbon throughout its length or until the longitudinal feed of the ribbon is reversed, and then the type impressions will change their path to one which will be parallel with and to one side of the first path so that the return track will not correspond with the first track. In the machine illustrated in the drawings the relation between the center of rotation of the platen and the center of rotation of the ribbon operating lever is not affected by the change of case. Consequently the path of the type impressions of the capital letters

will be superimposed on the path of the small letters, and, as indicated in the drawings, quite a narrow ribbon may be employed and the use thereof along the paths *a* and *b* will tend to exhaust the inked surface completely and uniformly. It is to be understood, however, that my invention is not limited to constructions wherein the relation between the platen and the ribbon vibrator remains unaltered when the case is changed. Furthermore, while the drawings illustrate one construction of mechanism for automatically moving the ribbon to cover the printing point during printing operation and for thereafter moving said ribbon to uncover the printing point, it is to be understood that other means of accomplishing this result may be employed with my invention.

It will be apparent that from some aspects my invention is not limited to a construction embodying a vibrator or vibratory ribbon carrier, and may apply to a ribbon guide.

Various other changes may be effected in the construction, arrangement and operation of the parts, all without departing from the spirit and scope of the invention.

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

1. In a visible writing machine, the combination of printing keys, means for feeding a ribbon longitudinally, means for reversing the longitudinal feed of the ribbon, and means, including a vibrator operative by the printing keys, said last named means being operatively controlled by the ribbon reversing means for changing from one ribbon field to another.

2. In a visible writing machine, the combination of ribbon spools carrying a ribbon normally removed from the printing point, means for feeding the ribbon longitudinally, means for reversing the longitudinal feed of the ribbon, and means independent of said spools operatively controlled by the ribbon reversing means for changing from one ribbon field to another.

3. In a visible writing machine, the combination of a ribbon, a ribbon winding mechanism, means for reversing the ribbon winding mechanism, means for holding the ribbon normally away from the printing point, means for moving the ribbon automatically to cover the printing point, and means for altering the extent of said automatic movement, said last named means being operated by the ribbon reversing means.

4. In a visible writing machine, the combination of a pair of ribbon spools, winding means therefor, means for reversing said winding means, a ribbon carrier normally away from the printing point, means for moving said carrier to and from the printing point, and means for altering the extent

of movement of said carrier, said last named means being operatively controlled by the said ribbon reversing means.

5 5. In a visible writing machine, the combination of a pair of ribbon spools arranged one at either side of the printing point, winding means for said spools, means for reversing said winding means, a ribbon carrier arranged between the spools and normally away from the printing point, means for moving the carrier independently of the spools to and from the printing point, and means for altering the extent of movement of the carrier, said last named means being
10 operated by the said reversing means.

15 6. In a visible writing machine, the combination of a pair of ribbon spools arranged one at either side of the printing point, winding means for said spools, means for reversing said winding means, a ribbon carrier arranged between the spools and normally away from the printing point, means for throwing the carrier upward one or another of a plurality of predetermined distances to cover the printing point during printing operation, and means for changing automatically from one to another of said predetermined distances the throw of said carrier.

30 7. In a visible writing machine, the combination of a pair of ribbon spools arranged one at either side of the printing point, winding means for said spools, means for reversing said winding means, a ribbon carrier arranged between the spools and normally away from the printing point, means for throwing the carrier upward one or another of a plurality of predetermined distances to cover the printing point during
40 printing operation, and means for changing automatically from one to another of said predetermined distances the throw of said carrier when the said reversing means is actuated.

45 8. In a visible writing machine, the combination of a series of printing keys, a ribbon, a ribbon winding mechanism, means for reversing said ribbon winding mechanism, means operated by the printing keys for moving the ribbon to and from the printing point, and means operatively controlled by said reversing means for altering the to-and-fro movement of the ribbon.

50 9. In a visible writing machine, the combination of a series of printing keys, a universal bar operated by said printing keys, a ribbon, a ribbon winding mechanism, means for reversing said ribbon winding mechanism, means actuated by said universal bar for moving the ribbon to and from the printing point, and means connected with said ribbon winding mechanism and with said reversing means and operable by the latter for altering said to-and-fro movement of the ribbon.
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10. In a visible writing machine, the combination of a ribbon carrier, means for moving said carrier to and from the printing point, a ribbon winding mechanism, means for reversing said ribbon winding mechanism, and a switching member operable by said reversing means to alter the movement of said carrier moving means. 70

11. In a visible writing machine, the combination of a ribbon carrier, a lever adapted to move said carrier to and from the printing point, ribbon winding mechanism, means for reversing said ribbon winding mechanism, and means for automatically altering the throw of said lever only when said reversing means is operated. 75

12. In a visible writing machine, the combination of printing keys, a ribbon vibrator, a lever for operating said vibrator, a link operable to be set to act upon said lever at one or another of a plurality of predetermined distances from its fulcrum, means for actuating said link, and means for automatically moving said link from one set position to another during the operation of the printing keys. 80

13. In a visible writing machine, the combination of printing keys, a ribbon carrier, a lever for operating the same, a link operable upon said lever at one or another of a plurality of predetermined points, means for actuating said link, means for setting said link to engage with the operating lever at one of said predetermined points, and means for automatically resetting said link to engage with said lever at another of said predetermined points during the operation of the printing keys. 85

14. In a typewriting machine, the combination of printing keys, a ribbon vibrator, a single lever for operating said vibrator, a single link for actuating said lever, means for setting said link in a fixed relation with said lever, means for automatically altering during the operation of the printing keys, the set position of said link to change said fixed relation, and means for actuating said link. 90

15. In a typewriting machine, the combination of printing keys, a ribbon vibrator, a single lever for operating said vibrator, a single means operative upon said lever at one or another of a plurality of predetermined distances from its fulcrum, and automatic means for setting said single means to operate upon said lever at one or another of said predetermined distances, said automatic means operating during the actuation of the printing keys. 95

16. In a typewriting machine, the combination of printing keys, a ribbon vibrator, a single lever for operating the same, a key actuated universal bar, a single link connected with said universal bar and operative upon said lever to throw said vibrator one or 100

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another of a plurality of different predetermined distances, and automatic means for altering the set position of said link to change the predetermined distance to which the vibrator is thrown, said automatic means operating during the actuation of the printing keys.

17. In a typewriting machine, the combination of a ribbon vibrator, a slotted lever for operating the same, a link provided with a pin adapted to engage the slot in said lever, means for setting said link and thereby fixing the relation between said link and said lever, means for automatically altering the set relation between said link and said lever whereby they are caused to engage in another and different predetermined fixed relation, and means for actuating said link.

18. In a typewriting machine, the combination of printing keys, a ribbon vibrator, a single lever adapted to operate the same, a single means for actuating said lever to throw said vibrator one or more predetermined distances, a means adapted to set said single means in a fixed relation with said lever, and automatic means adapted to alter the set relation between said lever and said single means and to maintain the two set in another and different fixed relation, said automatic means operating during the actuation of the printing keys.

19. In a typewriting machine, the combination of printing instrumentalities, a ribbon, means for feeding said ribbon longitudinally, a ribbon vibrator, means for throwing said vibrator one or another of a plurality of predetermined distances so as to cause the types to follow one or another of a number of predetermined parallel paths longitudinal of said ribbon, and automatic means for changing the throw of said vibrator directly from one to another of said predetermined distances.

20. In a typewriting machine, the combination of printing instrumentalities, a ribbon, ribbon winding mechanism, a ribbon vibrator, an operating lever therefor, actuating means adapted to act on said lever at one or another of a plurality of predetermined points so as to cause the types to follow one or another of a plurality of straight, parallel and distinct paths longitudinal of said ribbon, and means for automatically shifting said actuating means from one to another of said predetermined points.

21. In a typewriting machine, the combination of printing instrumentalities, a ribbon, means for feeding said ribbon longitudinally, a ribbon vibrator, an operating lever therefor, actuating means adapted to act on said lever at one or another of a plurality of predetermined points so as to cause the types to follow one or another of a plurality of straight, parallel and predetermined paths longitudinal of said ribbon, and a shifting

member adapted to shift said actuating means automatically from one to another of said predetermined points.

22. In a typewriting machine, the combination of printing instrumentalities, a ribbon, means for feeding said ribbon longitudinally, a ribbon vibrator, an operating lever therefor, actuating means adapted to co-act with said lever in one or another of a plurality of predetermined fixed relations and thereby to cause the printing types to follow one or another of a plurality of predetermined, distinct paths, and means for automatically changing from one to another of the predetermined fixed relations between the operating lever and its actuating means.

23. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, a universal bar, a link pivoted to said universal bar and connected by a pin and slot connection with said lever and adapted to operate on said lever at one or another of a plurality of different predetermined points, a means tending to maintain said link in engagement with said lever at the predetermined point farthest from the fulcrum of said lever, a driving shaft, means for automatically moving said driving shaft longitudinally, and means connected with said driving shaft and operable by the latter as it is moved longitudinally for causing said link to engage said lever at another of said predetermined points.

24. In a typewriting machine, the combination of a ribbon vibrator, a slotted operating lever for said vibrator, a universal bar, a link pivoted to said universal bar and provided with a stud engaging said slotted operating lever, a spring tending to maintain said link at the rear of the slotted operating lever, a driving shaft, means for moving said driving shaft longitudinally, and a shifting cone fixed on said driving shaft, said cone being adapted to move said link forward longitudinally of said operating lever.

25. In a typewriting machine, the combination of printing keys, a ribbon vibrator, means for throwing said vibrator one of a definite number of predetermined separate distances, and automatic means for changing the throw of said vibrator directly from one to another of said predetermined distances during the operation of the printing keys.

26. In a typewriting machine, the combination of printing keys, a ribbon vibrator, an operating lever therefor, actuating means adapted to act on said lever at one of a definite number of predetermined separate points, and means for automatically shifting said actuating means from one to another of said predetermined points during the operation of the printing keys.

27. In a typewriting machine, the com-

5 combination of printing keys, a ribbon vibrator, an operating lever therefor, actuating means adapted to act on said lever at one of a definite number of predetermined points, and a shifting member adapted to shift said actuating means automatically from one to another of said predetermined points during the operation of the printing keys.

10 28. In a typewriting machine, the combination of printing keys, a ribbon vibrator, an operating lever therefor, actuating means adapted to co-act with said lever in one of a plurality of predetermined fixed relations, and means for automatically changing from 15 one to another of the predetermined fixed relations between the co-acting parts during the operation of the printing keys.

29. In a typewriting machine, the combination of printing keys, a ribbon normally removed from the printing point, means for moving the ribbon automatically an unvarying extent to cover the printing point during a plurality of successive operations of the printing keys and other means operative on 25 said first named means for varying the extent to which the ribbon is moved, so that during a plurality of successive operations of the printing keys the ribbon will be moved another and different unvarying extent to 30 cover the printing point, said other means operating automatically on the first recited means during the operation of the printing keys and being controlled by said printing keys.

35 30. In a typewriting machine, the combination of printing keys, a ribbon normally removed from the printing point, means for moving the ribbon automatically an unvarying extent to cover the printing point, and means, comprising a rotary device operative on said first named means and by said printing keys, for automatically altering the distance the ribbon is moved to cover the printing point, said altered distance remaining 40 unvaried during a plurality of successive operations of the printing keys.

31. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, an actuator for moving said lever, and a rotary member operative on said actuator to fix its relationship with said lever to cause said vibrator to be thrown an unvarying distance.

32. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, an actuator for moving said lever, a rotary member operative on said actuator to fix its relationship with said lever to cause said vibrator to be thrown 55 an unvarying distance, and means for shifting said rotary member to alter the throw of the vibrator.

33. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, an actuator for moving said 60

lever, and a rotary member having a cylindrical portion and a sloping portion and operative on said actuator to control its relations with said lever and cause the ribbon to be used along different longitudinal lines 70 or fields.

34. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, an actuator for moving said lever, a rotary member having a cylindrical portion and a sloping portion and operative on said actuator to control its relations with said lever and cause the ribbon to be used along different longitudinal lines or fields, and means for maintaining said actuator in 80 coöperative relation with said rotary member.

35. In a typewriting machine, the combination of a ribbon vibrator, an operating lever therefor, an actuator for moving said lever, a rotary member having a cylindrical portion and a sloping portion adapted to co-operate with said actuator, and means for shifting said rotary member transversely of said actuator in order to bring said cylindrical portion into and out of coöperative relation with said actuator whereby the ribbon may be written upon in different longitudinal lines. 85

36. In a sight writing typewriter, the combination of a ribbon guide, a means for imparting a throw thereto to bring the ribbon over the printing point, a means for varying said throw to change the portion of the ribbon brought over the printing point, means for shifting the direction of the ribbon feed, and a connection between the ribbon feed shifting means and the throw varying means, whereby one of said parts may be set through the other. 90 100 105

37. In a typewriting machine, the combination of a pair of ribbon spools capable during the operation of the machine of rotary movements only, means for rotating said spools, means for reversing the direction of rotation of the spools, a ribbon guide, and means for controlling the guide operating automatically when the ribbon reversing means is operated to effect a widthwise shift of the ribbon. 110 115

38. In a typewriting machine, the combination of a pair of ribbon spools, a ribbon guide between the spools and operable independently of them, means for rotating said spools, means for reversing the direction of rotation of the spools, and means for controlling the guide operating automatically when the ribbon reversing means is operated to effect a widthwise shift of the ribbon. 120

39. In a typewriting machine, the combination of means for feeding a ribbon lengthwise, means for reversing the lengthwise feed of the ribbon, ribbon-throwing means, and means for changing the throw of the ribbon when the lengthwise feed is reversed. 125 130

40. In a typewriting machine, the combination of a ribbon carrier, means for throwing it variably, longitudinal ribbon feed mechanism, and reverse feed mechanism;
5 the throwing means being varied by connection with the reverse mechanism.

Signed at the borough of Manhattan, city

of New York, in the county of New York, and State of New York, this 25th day of February, A. D. 1905.

MORRIS W. POOL.

Witnesses:

E. M. WELLS,

M. F. HANNWEBER.