

Aug. 28, 1928.

F. A. HART

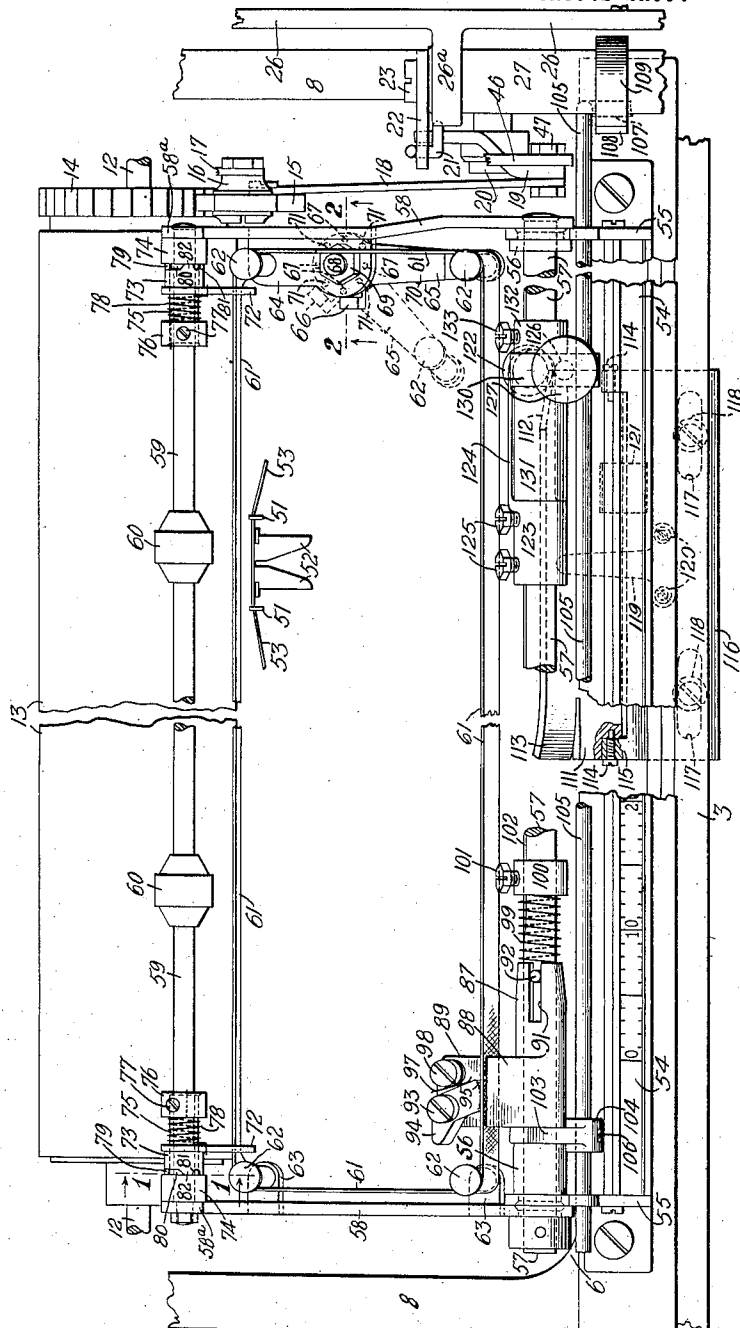
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TYPEWRITING MACHINE

Filed Aug. 8, 1925

4 Sheets-Sheet 1

Fig. 1



WITNESSES

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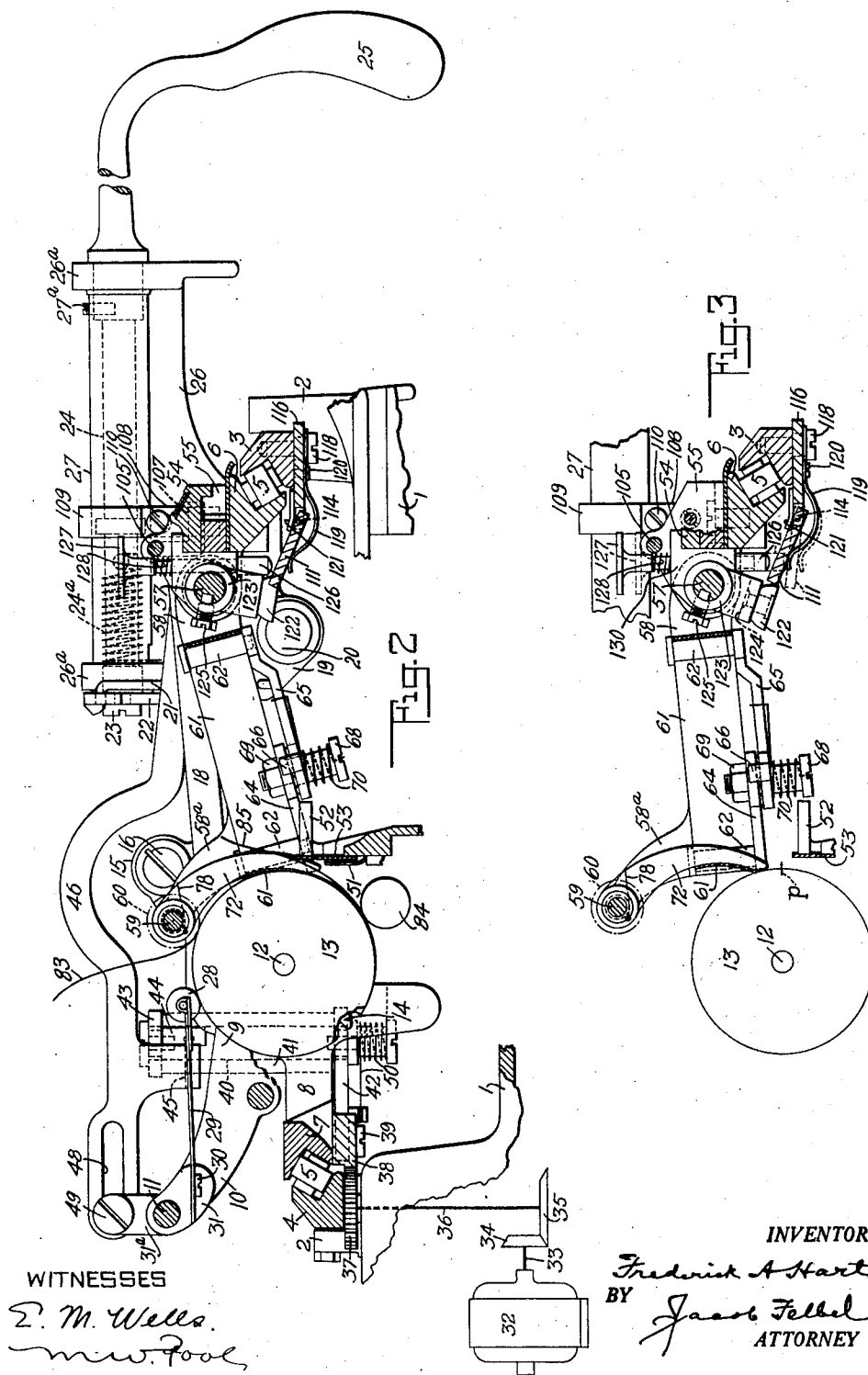
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TYPEWRITING MACHINE

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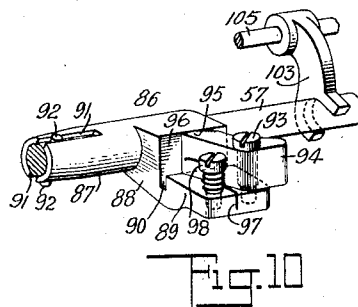
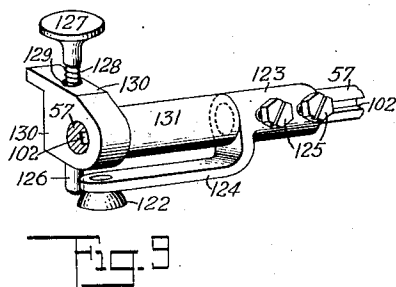
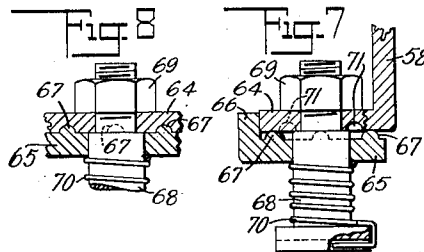
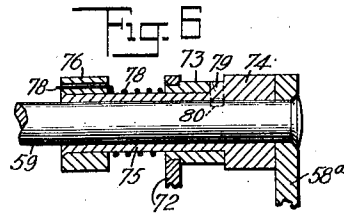
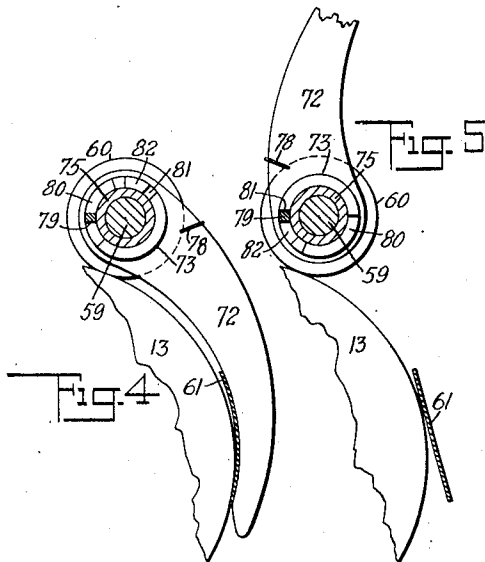
1,682,333

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TYPEWRITING MACHINE

Filed Aug. 8, 1925

4 Sheets-Sheet 3



WITNESSES

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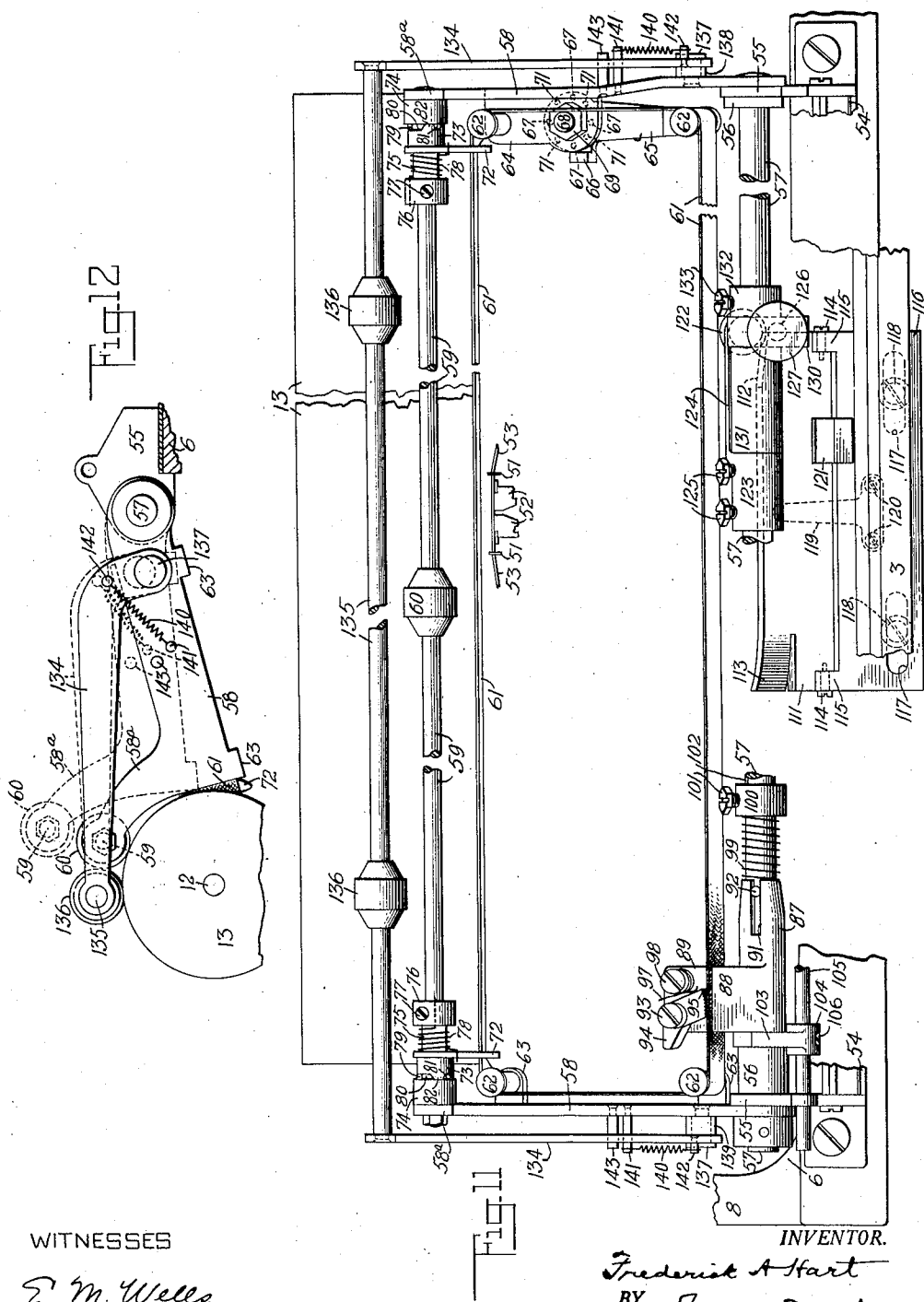
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TYPEWRITING MACHINE

Filed Aug. 8, 1925

4 Sheets-Sheet 4



WITNESSES

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UNITED STATES PATENT OFFICE.

FREDERICK A. HART, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO REMINGTON TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPEWRITING MACHINE.

Application filed August 8, 1925. Serial No. 48,992.

My invention relates to ribbon mechanism for typewriting machines and more particularly to mechanism for feeding and controlling a ribbon mounted on the traveling carriage of the machine and intended primarily to supplement the main vibratory ribbon.

The chief object of the invention is to provide new and improved mechanism for feeding and controlling such a ribbon and which is usually called a carriage-carried ribbon.

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

In carrying out my invention in the present instance I prefer to make use, as a support for the carriage-carried ribbons, of the paper bail of the Remington bookkeeping machine to which my invention is shown as applied. The ribbon which is endless is stretched around four guides at the four corners of a rectangle, these guides being mounted on the paper bail and one of them being spring pressed to tension the ribbon, the tensioning guide being adapted to be held out of normal position when desired so that the ribbon may readily be removed and replaced. The ribbon inclines downward from front to rear so that the rear ply or portion which stretches lengthwise of and over the printing line on the platen is at a slight angle to the vertical. To correct this, spring fingers are provided on the bail frame which press down on the ribbon and hold it in a vertical or substantially vertical position conforming to the platen surface. The endless ribbon is fed by gripping jaws mounted on a feed slide which is connected with the regular line-spacing mechanism so that when the line spacing mechanism is actuated the gripping jaws pull from left to right to advance the ribbon step by step, but relax to slide over the ribbon inoperatively on the return movement from right to left. The line spacing mechanism may be actuated both by hand and also electrically, so that dual means are provided for actuating the carriage-carried ribbon.

The carriage-carried or supplementary ribbon mechanism while it may be employed in various ways within the scope of the in-

vention was primarily designed for use in writing a check record simultaneously with the writing on the face of the check proper by means of the regular vibratory ribbon. One or more columns on the check record are customarily left blank and to provide for this the endless ribbon is automatically raised above the printing line by cam devices at a predetermined point in the carriage travel. The cam is mounted on a stationary part and co-operates with a roller carried by a projection or arm fixed to and extending from the rock shaft of the paper bail in such a way as to swing the bail upward on its pivots, thus raising the ribbon guides and the ribbon automatically when the carriage reaches a predetermined point in its travel from right to left. During return movements the roller rides over the cam and depresses it, the cam being spring mounted for this purpose, the result being that the ribbon is not lifted during these return movements, unnecessary work being thus avoided. A key is provided in association with the roller mounting, which key is effective to depress the cam at will so that when, as sometimes happens, it is desired to write in the blank column or columns, the cam may be rendered inoperative during leftward travel of the carriage.

In the foregoing construction whenever the ribbon is lifted to clear the printing line the paper bail will be swung upward. It may be preferred to have the bail independent of or unaffected by the lifting of the ribbon and for this purpose I have provided a modified construction wherein a sub-bail remains engaged with the platen when the ribbon bail or carrier is swung up ordinarily; although a greater degree of movement of the ribbon bail will be transmitted to the sub-bail.

My invention will be described in detail in connection with the accompanying drawings, wherein

Figure 1 is a fragmentary plan view of the carriage of a Remington bookkeeping machine embodying my invention.

Figure 2 is a vertical sectional view taken transversely of said carriage, part of the carriage mounting also being shown.

Figure 3 is a view corresponding to Fig. 2 but omitting some of the parts illustrated

therein and showing other parts in different relation.

Figure 4 is a vertical sectional view taken on the section line 1—1 in Fig. 1 and looking in the direction of the arrows at said line, said Figure 4 being drawn to an enlarged scale and illustrating one of the spring guide fingers in operative position.

Figure 5 is a view corresponding to Fig. 4 but showing the guide finger thrown up or lifted.

Figure 6 is a sectional view taken longitudinally of the axis of one of the spring fingers.

Figure 7 is an enlarged fragmentary vertical sectional view taken on a plane designated by the section line 2—2 in Fig. 1 and looking in the direction of the arrows at said line.

Figure 8 is a view showing the detent devices of Fig. 7 interseated.

Figure 9 is a perspective view of the roller or cam device and its carrier together with the key for depressing the associate cam device or plate at will.

Figure 10 is a perspective view of the feed slide and associate parts.

Figure 11 is a fragmentary plan view of a modification, and

Figure 12 is a fragmentary end view of the modification.

Referring first to Figs. 1 and 2, the main frame of the Remington machine comprises as shown a top plate 1 from which rise lugs 2 that support front and rear guide rails 3 and 4. Said guide rails are formed with oppositely facing grooves which receive anti-friction rollers 5 that likewise co-operate with the grooved front and rear bars 6 and 7 of a rectangular carriage truck that further comprises end bars 8 connecting the front and rear bars 6 and 7. In addition to the truck the traveling carriage of the Remington typewriting machine comprises a carriage frame which includes end bars 9 having extensions 10 connected by a cross rod 11. The end bars support axle portions 12 on which is mounted a rotary cylindrical plate 13. The platen frame comprising the bars 9 is adapted to be shifted on the truck to alter the position of the platen and change case, but in the instance of the Remington bookkeeping machine the platen frame is preferably secured in fixed relationship with the truck and does not shift thereon. Operatively connected to the right-hand end of the platen 13 is a line spacing ratchet wheel 14 with which co-operates a line spacing pawl 15 pivoted at 16 to a carrier 17 mounted to swing co-axially with the platen. The pawl 15 is connected by a link 18 with one arm of a bell crank 19 that is pivoted at 20 to the right-hand end bar 8. The other arm of the bell

crank 19 is connected by a wire link 21 with a crank arm 22 that is secured by a screw 23 to the rear end of a rock shaft 24, said rock shaft extending forwardly and having a bent-down handle or finger piece 25. The rock shaft 24 is pivotally supported in the parallel ears 26^a of a supplementary end bar or casting 26 that is detachably fixed to the right-hand end bar 8. The rear end portion of the rock shaft 24 is surrounded by a coiled restoring spring 24^a which is covered or housed by a tube 27 that surrounds the rock shaft between the bearing ears 26^a, said tube being secured in fixed relationship with the rock shaft by a screw 27^a, so that tube and shaft always turn together. During ordinary line spacing operations an actuation of the handle 25 will rock the shaft 24, and swing down the crank arm 22, this motion being transmitted through the link 21 to the bell crank 19 and thereby through the link 18 to the carrier 17 and pawl 15, causing the pawl to co-operate with the ratchet wheel 14 in the usual manner to turn the platen through a unit of line spacing distance. Between line spacing operations the platen is held against accidental turning movements by detent devices comprising a roller detent 28 which co-operates with the teeth of the ratchet wheel 14, said detent being mounted at the free end of a spring arm 29 that is secured by a screw 30 to the under face of a lug 31 on the rod 11.

In addition to the hand actuated devices comprising the rock shaft 24 and its connections for operating the pawl and ratchet devices 15—14, I preferably also employ for actuating the said pawl and ratchet devices electrical means of the character fully disclosed and claimed in my prior application filed Feb. 6, 1925, Sr. No. 7,213. A brief description of said means will be given in connection with Fig. 2, wherein certain of the parts are diagrammatically illustrated. The electrical line-spacing means comprises an electric motor 32, which is connected by shafting 33 with a bevel gear 34 that intermeshes with a larger bevel gear 35 secured to the lower end of a vertical shaft 36, carrying at its upper end a gear 37 which meshes with a toothed bar or rack 38 that is arranged at the under side of the rear bar 7 of the carriage truck, from which it is supported by headed screws 39. These screws pass freely through slots or elongated holes in the rack and are threaded into the bar 7, the mounting being such as to allow of a slight independent endwise movement of the rack 38 before it starts to drive or transmit movement to the carriage from the motor. A vertical shaft 40 is mounted on a bracket 41 secured to the right-hand end bar of the carriage, said shaft having at

its lower end a crank arm 42 which lies in the path of the rack 38 and is adapted to be engaged by the right-hand end thereof. At its upper end the shaft 40 carries a leftwardly extending arm or crank 43 having a pin 44 which stands in the path of a lug or ear 45 bent off horizontally from a bar 46, the forward end of which is pivotally connected at 47 to the bell crank 19. The rear end of the bar 46 is formed with a guide slot 48 which engages a screw pin 49 that bridges a guide slot formed in an upward extension 31^a of the lug 31, the rear end portion of the bar 46 being guided in this slotted extension. When the electrical connection is made at the end of a line, motion is transmitted through the described train of connections comprising the shaft 36, gear 37, rack 38, arm 42, shaft 40, arm 43 and pin 44 to the bar 46, which actuates the bell crank 19, causing it to transmit movement through the link 18 to the pawl 15 and thence to the ratchet wheel and platen as when the pawl is actuated by hand. The parts of the electrical train are restored by a spring 50. Thus there are provided dual means for alternatively actuating the pawl-and-ratchet line-spacing mechanism. Under actuation of the handle 25 the electrical train other than the bar 46 is not affected.

The usual vibrating ribbon mechanism is employed comprising (Figs. 1 and 2) a vibratory ribbon carrier or vibrator 51 mounted to vibrate up and down on the center guide 52. The main ribbon 53 which is threaded through the vibrator 51 is adapted to be fed back and forth and reversed as is usual. It will be understood that at each actuation of the type bars, not shown, the ribbon 53 which normally is maintained below the printing line on the platen will be automatically lifted into the path of the on-coming type which will strike through the ribbon to make an imprint on the work sheet or paper that is immediately behind it.

To support the supplementary or carriage-carried ribbon mechanism to which my invention especially relates, I make use of the paper controlling bail of the machine which will be briefly described. Secured to the front bar 6 of the carriage truck is a scale bar 54 at the ends of which are mounted angled brackets 55, the vertical rearwardly projecting portions whereof are formed with hubs 56 that are perforated to provide bearings for a bail rock shaft 57. The end portions of the rock shaft project outwardly beyond its bearings and have secured to them side arms 58 which extend rearward and upward, terminating in horn-like portions 58^a which are connected by a cross rod 59 on which are adjustably mounted the usual rolls 60 that co-operate with the front upper portion of the platen above the printing line thereon. It will be understood that the

paper bail is a rigid rectangular frame, comprising the rock shaft 57, the bail arms 58 and the cross rod 59, which may be swung or rocked about the axis of the shaft 57 to throw the bail into and out of use.

The supplementary or carriage-carried ribbon 61 (Figs. 1-5) is mounted or supported wholly on the paper bail. The ribbon 61 is preferably endless, it having been found in practice that a very large number of copies comprising several days' work may be printed from such a ribbon before it becomes exhausted. The ribbon 61 is rectangularly disposed and guided or supported on four guides, arranged in pairs disposed at opposite sides of the bail. The guides may be of any desired construction and as herein shown are in the form of headed pins 62. The pair of guide pins 62 at the left-hand side are riveted or otherwise secured to ears 63 projecting horizontally inward from the left-hand side arm 58 at its under side. The right-hand pair of guide pins 62 are supported on a single ear or ledge 64 projecting inward from the under side of the right-hand side arm 58. The rear pin 62 is riveted to the ledge 64 similarly to the left-hand pair of pins. The forward pin 62 of the right-hand pair is however movably supported for the purpose of maintaining a constant tension on the ribbon and also for facilitating its adjustment. The movable mounting is clearly shown in Figs. 1-3, 7 and 8. The said pin 62 is riveted or otherwise fixed to the free end of an arm 65, said arm extending rearward and terminating in an enlargement, at the left side of which is an upstanding stop lug 66. The upper face of the rear end portion of the arm 65 is formed with a plurality of bosses or projections 67, preferably four in number, and said rear end portion is perforated to pivotally fit over a headed shouldered screw 68 which is threaded upward through the ledge 64 and fixed in place by a nut 69. The arm 65 is constantly pressed upward by a spring 70 coiled around the body portion of the screw 68 and confined between the under side of the arm 65 and the head of the screw. Said spring normally maintains the bosses 67 in contact with the under face of the ledge 64. Also the lower end of the spring 70 is anchored to the head of the screw 68 while the opposite end of said spring is hooked over the left-hand edge of the arm 65 and constantly tends to swing said arm rightward about its pivot 68, thus maintaining a constant spring tension on the arm 65 and its pin 62, this tension being transmitted by said pin to the endless ribbon 61. In order to relieve the ribbon of tension so that it may be adjusted or removed and replaced by a fresh ribbon the arm 65 may be swung on its pivot leftward to the dotted line position shown in Fig. 1,

leftward movement being limited by the engagement of the stop 66 with the left-hand edge of the ledge 64 back of the pivot 68. The under face of the ledge 64 is provided with four depressions 71 to which the bosses 67 are adapted when the arm 65 has been swung outward to the dotted line position. As soon as the bosses register with their seats or depressions 71 they will be forced to engage therewith by the upward pressure of the spring 70, the construction being such that the arm is maintained locked off in the dotted line position by the detent devices 67, 71. A slight forward pull on the arm will unseat the bosses and enable the spring 70 to swing it forward and rightward to the normal tensioning position. It will be observed that the spring 70 performs two functions, acting on the arm to swing it about its pivot and maintain it under tension, and also pressing said arm upward so as to render the detent devices effective to lock off the arm when it is swung to the left. As a result of keeping the ribbon 61 under tension its rear length or ply will be maintained taut and in a straight line extending lengthwise of the platen and opposite the printing line thereon. This printing ply of the ribbon extends substantially the full length of the platen and it will be noticed that the rear guides 62 are so disposed that said ply is located behind the printing portion of the vibratory ribbon 53.

The side arms 58 of the paper controlling bail incline downward from front to rear and this results in the rear ribbon guides 62 being lower than the front guides, and in all of the guides being at an inclination to the vertical, as will be clearly understood from Fig. 2. As a consequence the printing ply of the ribbon passing over the inclined rear guides tends to follow their inclination and stand away from the face of the platen at its lower edge portion. To remedy this defect and cause the printing ply of the ribbon to lie substantially vertically and conform more or less closely with the platen surface, there are provided supplementary spring pressed guides as shown in Figs. 1-5. There are two of these guides pivotally mounted on the rod 59 and arranged near opposite ends thereof. Each of the supplementary guides comprises a finger-like portion 72 curved generally to conform to the surface of the platen and provided at its top with an outwardly extending hub portion 73 which fits over the rod 59. Each guide finger 72, 73 is loosely confined between an enlargement 74 on the end of the rod 59 and a collar 75 provided with a hub or flange 76 which receives a set screw 77 whereby the collar is secured to the rod 59. Surrounding each collar 75 is a coiled spring 78, one end of which is anchored to the associate hub 76 and the other end hooked

over the guide finger 72. The spring presses the guide device constantly towards the platen, maintaining it in engagement with the printing ply of the ribbon which is thereby confined between the platen and the rear edge of the finger 72, with the result that said ply is held contiguous to the platen throughout its width. There being one of these guides near each end of the printing ply, the whole length of the ply is thus controlled. The spring 78 associated with each guide finger 72, 73 also tends to press said guide finger outward and to maintain its hub 73 engaged with the inner face of the enlargement 74. This enlargement is provided with an inward laterally extending pin 79 which is adapted to play in a cutout 80 in the hub 73 when the finger is turned or swung upward. In addition to the cutout 80 the hub 73 is formed with a shorter cutout 81 which is separated from the cutout 80 by a closed portion 82. When it is desired to relieve the printing ply of the ribbon from the control of the guides 72-73 they may be swung upward from the position shown in Figs. 2 and 4 to that shown in Fig. 5. As each finger is swung upward the forward inclined end of the cutout 80 will encounter the pin 79 and will thereby be cammed inward against the pressure of its spring 78, forcing the closed portion 82 to slide or scrape over the pin. As soon as this portion clears the pin the finger will snap outward causing the opening or slot 81 to engage the pin, the two co-operating to act as detents and hold the guide finger 72, 73 in inoperative position. By pulling forward on the finger the reverse operation takes place and it is caused again to engage in spring pressed relationship with the ribbon ply.

Referring to the operation of introducing and feeding the paper, the record sheet, such as shown in Fig. 2 and numbered 83, is introduced at the rear of the machine and fed around the platen in the usual way, passing under the front feed roller 84 upward behind the printing ply of the ribbon 61 and thence beneath the bail rollers 60. The bill sheets are front-fed and are introduced into the machine behind the line gage and paper guide (not shown) and forward of the printing ply of the ribbon 61. As appears from Fig. 1, each bill sheet, 85, is so introduced that it lies between the two ribbons, being behind the vibratory ribbon 53 but forward of the supplemental ribbon 61. During printing operations the bill sheet 85 will receive imprints on its front face through the ribbon 53, these imprints being duplicated on the record sheet 83 through the ribbon 61. The ribbon 61 will also offset on the back of the bill sheet 85, a not undesirable feature in the present instance where the bill sheet is a check.

As each line is written on the check or bill sheet it will be printed through the printing ply of the supplementary ribbon 61 which will travel with the platen during its letter spacing movements, the longitudinal relationship between the platen and the printing ply of the ribbon not being altered during the whole line-printing operation. In other words, the printing ply of the ribbon at the beginning of a line remains unchanged throughout the writing of the line and until it is fully completed. In order to exhaust the ribbon 61 evenly and prolong its life, it is desirable to feed or advance it longitudinally after each line of writing, and to this end means are provided for feeding the ribbon automatically when the platen is line spaced or turned between the lines of writing. The feeding means comprises a sliding element or feed slide shown in Figs. 1 and 10 and designated as a whole by the reference numeral 86. The feed slide 86 comprises a sleeve or hub portion 87 and an integral body or block portion 88 from which projects rearwardly a shelf or lip-like portion 89 whose face is separated from the block proper by a slotway 90. The feed slide or device 86 is mounted on the bail rock shaft 57, the sleeve 87 being perforated to fit slidably on the rock shaft. The inner end of the sleeve is formed with diametrically opposite slots 91 which engage with the projecting end portions of a cross pin 92 that passes through the rock shaft 57. There is afforded a limited sliding movement of the feed slide on the rock shaft while when the rock shaft is turned or rocked the feed slide is forced to participate in this rocking movement. Pivoted on the ledge 89 by a headed screw pin 93, which projects upward therefrom, is a gripping device or jaw 94, the working face whereof is roughened or corrugated as indicated at 95, said face co-acting with the rear vertical face 96 of the block 88. The front ply of the ribbon 61 is adapted to pass between the jaws, being guided at its lower edge portion through the slot 90. A wire spring 97 is coiled around a pin 98 which projects upward from the ledge 89, said spring acting against the pivoted feed jaw 94 to press it constantly towards the coacting jaw 88, 96. The parts are so related that when the feed slide 86 is moved leftward the jaws 94, 95 and 88, 96 will be maintained in spring pressed clamping engagement with the front ply of the ribbon and will force the ribbon to participate in rightward movements communicated to the feed slide, whereas during return movements the spring pressure will relax and the feed jaws will slide idly back over the ribbon which will remain stationary. The feed slide is constantly pressed towards the left by a coiled restoring spring 99 which sur-

rounds the rock shaft 57 and is confined between the end of the slide and a collar 100 which is secured by a set screw 101 to the rock shaft 57 (Fig. 1). The set screw 101 engages at its point in a groove 102 which is cut longitudinally in the rock shaft 57.

Means for connecting the feed slide with the line spacing mechanism comprises, as shown in Figs. 1 and 10, a fork 103 which loosely engages with the rock shaft 57 to the left of the feed slide and is adapted to engage with the left-hand face thereof. The fork is confined between the feed slide and the left-hand hub 56, the spring 99 normally maintaining the slide in contact with the fork 103 and the fork in contact with the hub. The fork 103 is provided with a hub portion 104 which fits over the left-hand end portion of a slide rod or link 105 and is secured thereto by a set screw 106. The rod 105 bears slidably in holes formed in the upright portions of the angular brackets 55 forward of and above the rock shaft 57. At its right-hand end the slide rod 105 is offset or angularly bent as indicated at 107 to engage rotatively in a hole or opening formed in the free end of a crank arm 108 having a hub portion 109. The crank arm is split so that it may be fitted readily over the tube or shell 27 and is in effect a split collar, it being clamped or secured in fixed relationship to said tube by a clamping screw 110 which bridges the split in the crank arm and connects the two portions or plies thereof. When the screw is sufficiently tightened the crank 108, 109 is secured fixedly on the sleeve and is compelled to rotate therewith. Such rotation of course occurs when the line spacing mechanism is actuated, either by the handle 25 or from the motor 32. At such line spacing operation the turning movement communicated to the rock shaft 24 and the tube 27 will be transmitted through the crank arm 108, 109 to the slide rod 105 and thence through the fork 103 to the feed slide 86, which will be slid rightward along the shaft 57, compressing the spring 99 and causing the gripping jaws or faces 95 and 96, which are in spring pressed engagement with the front ply of the ribbon to pull it rightward. As a consequence the endless ribbon will be moved slightly throughout its length, the front ply moving longitudinally towards the right and the rear or printing ply moving correspondingly towards the left and relatively to the platen. On the completion of the line spacing operation the ribbon feeding devices will be restored by the spring 99, the gripping jaws sliding idly over the ribbon. Thus the ribbon will be automatically fed or advanced a short distance longitudinally at each line spacing actuation.

As stated, it is sometimes desirable to

leave blank one or more of the columnar spaces on the record sheet 83. To this end adjustable means are provided for automatically lifting the printing ply of the ribbon 61 so that it will be raised out of the path of the printing types and will be ineffective so long as thus maintained. The automatic means for this purpose comprise a cam plate 111 which at its right-hand edge is formed with an incline or cam 112 and at its left-hand rear portion is split to provide a downwardly inclined cam portion 113 (Figs. 1-3). The cam plate 111 is hinged on screw pivot pins 114 which project inward from ears 115 formed at the sides of and extending rearward from a supporting plate 116 that is secured at the under side of the front rail 3. The plate 116 has elongated holes or slotways 117 which receive headed securing screws 118 that are threaded up into the rail and thus adjustably secure the plate 116 thereto. A leaf-spring 119 is secured to the under face of the plate 116 by screws 120, the free end of said spring extending rearward and contactively engaging with the underface of the hinged cam plate 111, which plate it tends to maintain in the normal upwardly inclined position shown in Figs. 2 and 3, and against a stop plate 121 secured to the upper face of the plate 116. Co-operative with the cam plate is a roller 122, said roller being pivoted on a roller carrier illustrated in Figs. 1-3 and 9 and comprising a hub or sleeve portion 123 and an arm 124 which is bent off from the hub and extends longitudinally rightward therefrom, carrying at its free end the pivoted roller 122. The roller carrier is adjustably secured to the rock shaft 57, the hub 123 fitting over said rock shaft and receiving set screws 125 which engage in the groove 102, thus insuring the proper position of the roller carrier for all adjustments. The roller and its carrier are in effect a projecting device from the rock shaft. Associated with the roller carrier is a spring plunger 126 provided with a key or finger piece 127 and surrounded by a coiled spring 128 which is housed in a depression 129 formed in a block or plunger carrier 130, said plunger carrier fitting over the rock shaft 57 and being maintained in substantially unvarying normal relationship with the roller 122 and its support or carrier, 123, 124. To this end a spacing sleeve 131 is interposed between the plunger carrier 130 and the roller carrier, preventing displacement of the plunger carrier lengthwise of the shaft 57 in one direction or towards the left. Rightward displacement of the plunger carrier on the shaft is prevented by a collar 132 which is fixed to the shaft by a set screw 133. To reset the projecting device (i. e. the roller and its carrier) and the plunger, it is necessary to loosen the screws 125 and the screw 133, so the parts may be

adjusted together. Part 130 is undercut to rest on bar 54, preventing forward rotation.

The cam devices comprising the plate 111, the roller 122 and its carrier, together with the plunger 126, 127, are so related or adjusted that they may be brought into co-operation whenever the column on the record sheet that is to be left blank comes opposite the printing point during the leftward movements of the carriage. The adjustments are such that at this time the roller 122 will contactively engage with the cam edge 112 of the cam plate as shown in Fig. 1. Thereafter as leftward movement of the carriage continues, the roller will ride up on the cam and, since its support 124 is in the nature of a crank, will as a consequence turn the rock shaft 57 in its bearings, thus lifting the paper bail and the ribbon guides and ribbon that are mounted thereon, carrying the ribbon to an inoperative position. The parts in their raised or lifted inoperative position are illustrated in Fig. 3, from which it will be observed that the carriage-carried ribbon has been raised above the printing point on the platen indicated by the cross line *p*. The ribbon will be held in its raised inoperative position as the carriage travel continues towards the left, until the roller 122 clears the rear straight edge of the cam plate 111 when the paper bail and the ribbon guides and ribbon will drop down again to the normal or Fig. 1 position. During return movements of the carriage the roller 122 will contact with the downwardly bent cam portion 113 and will depress the cam plate 111 swinging it downward on its pivots 114 against the spring 119 to the dotted line position in Fig. 3. As a result the cam plate is automatically rendered ineffective and the bail and ribbon mechanism will not be disturbed during the return movement of the carriage.

At times it may be desirable to print in the blank column or columns on the record sheet, and to this end the cam devices 111, 122 may be rendered ineffective during leftward travel of the carriage by means of the spring plunger device 126, 127. At such times when the carriage movement brings the cam devices into the relationship shown in Fig. 1 it is only necessary to press the key 127, lowering the plunger 126 against its spring and causing its point, acting against the top face of the cam plate 111, to swing it downward against the pressure of its spring 119 to the dotted line position of Fig. 3. In this position it is clear of the path of the roller 122 so that as the roller travels leftward it will not be affected by the cam plate. It will be apparent that as soon as the roller has passed the right-hand end portion of the cam plate the plunger may be released, since then the cam can only swing upward until it contacts with the bottom face of the roller which will

thereafter slide ineffectively over the upper face of the cam plate until it clears it.

In the described construction illustrated in Figs. 1-10 the paper bail and the ribbon
 5 guiding devices as a whole are not relatively movable in respect to each other. As a result whenever the printing ply or working face of the ribbon 61 is displaced or lifted from the printing face of the platen the
 10 bail must also be lifted, causing the bail rolls 60 to separate from the platen. Sometimes this may be inconvenient or undesirable since it frees the upper portion of the work sheet or record sheet 83 from control. Accord-
 15 ingly I have provided a modified construction illustrated in Figs. 11 and 12 wherein the supplementary ribbon may be lifted or shifted to clear or uncover the printing line without freeing the paper from control. In
 20 the Figs. 11-12 modification the paper controlling bail itself is of the same construction as usual, and as illustrated in Figs. 1-10 and described hereinbefore, except that instead of two bail rolls 60 only one is em-
 25 ployed, this single roll 60 being located at the middle of the roll rod or bar 59. Also the ribbon feeding, guiding and controlling devices are the same in the modification as in the first described construction and have
 30 been given the corresponding numbers, so that it is not deemed necessary to describe them in detail or explain their mode of operation. Wherein the modification differs from the first described construction is pri-
 35 marily in the provision of an addition or supplemental paper controlling device or bail which is mounted on the main or regular paper bail device. The supplemental bail comprises side arms 134 and a connect-
 40 ing cross rod 135 on which are mounted a pair of pressure rolls 136, these being spaced apart or adjusted near the ends of the rod 135 so that the roll 60 on the other bail is about midway between and forward of them.
 45 The sub-bail 134 is pivoted on the main bail by means of headed shouldered rivets 137. These pivots or rivets are secured in the side arms 58, and the bail arms 134 are properly spaced from the arms 58 by spacing
 50 washers or sleeves 138 and 139 which are interposed between the said arms and supported on the shanks of the rivets 137. The two bails, that is, the main and the sub-bail, are so related that the pressure rollers 136 of
 55 the sub-bail co-operate with the platen in rear of the pressure roll 60 as will be apparent from Fig. 12. The two bails are further connected at their sides by draw or pull
 60 springs 140, the ends of these springs being connected to pins 141 projecting outward laterally from the bail arms 58 and to shorter lateral pins 142 on the bail arms 134, these pins being so related that the
 65 spring devices lie and act in lines parallel with the planes of movement of the bail

arms. The effect of the springs is constantly to tend to draw the bails together scissors-wise about their pivotal connections 137. The construction is such that when the main bail together with the ribbon guides and the
 70 ribbon 61 supported thereon are lifted or cammed upward by the cam devices 122, 111, as shown by dotted lines in Fig. 12, the sub-bail 134, 135 will not be substantially affected and its rolls 136 will remain in operative
 75 contact with the top of the platen. Also of course the sub-bail will remain quiescent when the main bail and the ribbon mechanism return to normal position. Thus, means are provided for controlling the work
 80 sheet constantly above the printing line of the platen while permitting the ribbon 61 and its supporting devices and controlling mechanism to be moved up and down or out of and back to operative relationship
 85 with the platen. In order however that the sub-bail may be lifted with the main bail when it is desired to clear the platen for paper adjustments or other purposes, contact pins 143 are secured to the bail side arms
 90 58 and project laterally outward therefrom into the plane of the arms 134 and so that if the main bail is swung upward and forward for the purpose of clearing the platen, the pins 143 engaging with the under edges
 95 of the arms 134 will swing the sub-bail automatically upward and forward bodily away from the platen around the pivotal axis 57 of the main bail.

My invention, while comparatively simple
 100 and inexpensive and readily applicable to the machine, has proven highly efficient in practical operation.

Various changes besides those specified may be made without departing from the
 105 invention, and its principles in whole or in part may be easily adapted to styles of writing machines other than that shown herein.

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

1. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail controlling the paper through the
 115 length of the platen, said bail being movably mounted on said carriage and co-operative with the platen, a carriage carried inking ribbon wholly supported on said movable
 120 paper bail, and a feeding device engaging directly with said ribbon and mounted on said bail.

2. In a front strike typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported at the
 125 front side of the carriage and co-operative with the platen above the printing line, a vibratory inking ribbon, a supplementary inking ribbon supported wholly on said paper bail and having its printing portion
 130 disposed behind the vibratory ribbon, and a ribbon-feeding clutch mounted on said bail

and engaging with the ribbon forward of its printing portion.

3. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage and co-operative with the platen, ribbon guides on said bail wholly supporting an endless inking ribbon, and a ribbon feeding clutch mounted on said bail and operative independently of said ribbon guides.

4. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail controlling the paper through the length of the platen, said bail being pivotally supported on said carriage and co-operative with the platen, ribbon guides on said bail carrying an endless ribbon, and means associated with certain only of said guides for maintaining a constant tension on said endless ribbon.

5. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and co-operative with the platen, and a plurality of guides carrying an endless ribbon, said guides being supported on said bail and so disposed that the endless ribbon is rectangularly arranged.

6. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail movably mounted on said carriage and co-operating normally with the platen, and ribbon guides on said bail carrying an endless ribbon, said guides being so disposed that the printing portion of said ribbon extends substantially throughout the length of the platen and is normally opposite the printing line.

7. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail mounted on said carriage and co-operating normally with the platen, ribbon guides on said bail carrying and endless ribbon, said guides being so disposed that the printing portion of said ribbon extends substantially throughout the length of the platen and is normally opposite the printing line, and a vibratory ribbon whose printing portion is normally below the printing point, the printing portion of the endless ribbon being behind the printing portion of the vibratory ribbon.

8. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage and comprising side arms and a connecting cross rod, and ribbon guides, said guides being four in number and disposed in pairs, a pair being mounted on each of said side arms.

9. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage, ribbon guides on said bail, and spring-pressed means associated with one of said guides,

said means being effective both to tension the ribbon and also to hold the guide out of operation.

10. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage and comprising side arms and a connecting cross rod, ribbon guides for an endless ribbon, said guides being four in number and disposed in pairs, one pair being mounted on each of said side arms, one of said guides being carried by an arm pivoted to the associate bail arm, and spring means associated with said pivoted arm for imparting tension to the ribbon guide carried thereby.

11. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage, ribbon guides for an endless ribbon, one of said guides being carried by an arm pivoted to the associate bail, spring means associated with said pivoted arm for imparting tension to the ribbon guide carried thereby, and detent devices associated with said pivoted arm, said spring means rendering said devices effective.

12. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivotally supported on said carriage and comprising side arms and a connecting cross rod, pairs of ribbon guides for an endless ribbon mounted on said side arms, one of said guides being carried by an arm pivoted to the associate bail arm, spring means associated with said pivoted arm for imparting tension to the ribbon guide carried thereby, and detent devices associated with said pivoted arm for maintaining it in inoperative position in opposition to said spring means.

13. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, and a second paper bail mounted on the first recited paper bail.

14. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, and a supplementary paper bail mounted on the first recited paper bail, said bails being movable into and out of contactive engagement with the platen independently of each other.

15. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, and a second paper bail mounted on the first recited paper bail, said first recited bail being movable out of engagement with the platen to render the ribbon inoperative without disturbing the second paper bail.

16. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, a second paper bail pivoted on the first recited paper bail, and spring means connecting the two bails.

17. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, said bail comprising side arms, a second bail pivoted to said side arms and co-operative with the platen above the first recited bail, and a spring connecting the two bails, said first recited bail being releasable independently of the second bail.

18. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, said bail comprising side arms, a supplementary bail pivoted to said side arms and co-operative with the platen above the first recited bail, said first recited bail being movable independently of the supplementary bail to render the ribbon inoperative, and means for enabling the first recited bail when given an additional movement to automatically release the supplementary bail.

19. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage and carrying a ribbon co-operative with the platen, said bail comprising side arms and a roll-carrying cross bar, a supplementary bail comprising a roll-carrying cross bar and also comprising side arms which are pivoted to the side arms of said first recited bail, said first recited bail being movable to render the ribbon inoperative without disturbing the supplementary bail, and means on said first recited bail effective when it is moved further to automatically throw off the supplementary bail.

20. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail mounted on said carriage and co-operating with the platen to control paper, and a second paper bail comprising a rigid U-shaped frame having parallel side arms pivoted near their ends on the first named paper bail, said second bail also co-operating with the platen.

21. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage, and a second paper bail mounted on the first named paper bail, said second bail comprising a U-shaped frame having parallel side arms pivoted directly to the side arms of the first bail, said bails being releasable independently of each other.

22. In a typewriting machine, the combination of a carriage, a platen thereon, a

paper bail mounted on said carriage, a second paper bail mounted on the first named paper bail, said bails being releasable independently of each other, and means on one of said bails for automatically releasing the other bail.

23. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage, a second paper bail pivoted on the first named paper bail, said bails being releasable independently of each other, and a pin on said first recited bail effective automatically to release the second bail.

24. In a typewriting machine, the combination of a carriage, a platen thereon, a paper bail pivoted on said carriage, a second paper bail pivoted on the first named paper bail, said bails being releasably independently of each other, and ribbon guides on one of said bails for wholly supporting an endless ribbon.

25. In a typewriting machine, the combination of a platen carriage, a platen thereon, a frame movably mounted on said carriage, ribbon guides on said frame, a projection on said frame, a releasable cam member with which said projection co-operates to move said frame and said ribbon guides, said cam member being mounted on a relatively stationary part, spring means tending constantly to maintain said cam member in effective position, and a key for at will rendering said cam member ineffective.

26. In a typewriting machine, the combination of a platen carriage, a platen thereon, a frame movably mounted on said carriage, ribbon guides on said frame, a projection on said frame, a cam plate hinged to a relatively stationary part, and spring means for maintaining said cam plate in operative position, said projection co-operating with said cam plate during the travel of the carriage in one direction to move said frame and ribbon guides relatively to the printing point, said projection acting during traveling movements of the carriage in the opposite direction to swing said cam plate automatically to inoperative position.

27. In a typewriting machine, the combination of a platen carriage, a platen thereon, a frame movably mounted on said carriage, ribbon guides on said frame for maintaining a ribbon constantly opposite the printing point on the platen, a projection on said frame, a cam plate hinged to a relatively stationary part, spring means for maintaining said cam plate in operative position, said projection during traveling movements of the carriage in one direction co-acting with one edge of said plate to rock the frame and render the ribbon inoperative, the cam plate remaining rigid during such rocking of the frame, said projection during return movements of the carriage acting on the face

of said plate to depress it and render it ineffective to rock said frame.

28. In a typewriting machine, the combination of a platen carriage, a platen thereon, a ribbon guiding frame movably mounted on said platen carriage, an engaging device for said frame, a spring mounted cam plate with which said device co-operates during the carriage travel, and a key for throwing said cam plate out of operative position at will.

29. In a typewriting machine, the combination of a platen carriage, a platen thereon, a ribbon guiding frame movably mounted on said platen carriage, an engaging device for said frame, a spring mounted cam plate with which said device co-operates during the carriage travel, and a key for throwing said cam plate out of operative position at will, said key and said device being maintained so that they are always in the same normal relative positions.

30. In a front strike typewriting machine, the combination of a carriage, a platen thereon, a frame movably mounted on said carriage and supporting a ribbon opposite the printing point, said frame maintaining the ribbon extending substantially the full length of the platen and tending to cause the printing portion to lie in a plane inclined to the vertical, and guide fingers for confining the printing portion of the ribbon to a predetermined position substantially vertical to the printing point, said guide fingers being releasable without affecting the ribbon supporting frame.

31. In a front strike typewriting machine, the combination of a carriage, a platen thereon, a ribbon supporting frame carrying an endless ribbon, said frame extending rearward from the front bar of the carriage and inclining downward, the printing portion of the ribbon extending substantially the full length of the platen and tending to lie in a plane inclined to the vertical, and spring-pressed guide fingers co-operative with said printing portion of the ribbon to cause it to conform substantially to the printing face of the platen.

32. In a typewriting machine, the combination of a carriage, a platen thereon, ribbon supporting devices, a guide for the printing ply of the ribbon, detent devices for said guide, and spring means effective both to maintain said guide in spring pressed engagement with the ribbon and also to render the detent devices effective when the guide is moved to inoperative position.

33. In a typewriting machine, the combination of a carriage, a platen thereon, ribbon supporting devices for a carriage carried ribbon, pivoted guide fingers co-operative with the printing portion of said ribbon to maintain it in printing position,

springs for rendering said guide fingers effective, and detent devices co-active with said fingers to maintain them in inoperative position when they are swung away from the platen, said springs acting also to render said detent devices effective.

34. In a typewriting machine, the combination of a platen, ribbon guiding fingers, a rod on which they are mounted, springs coiled on said rod for holding said fingers against the ribbon, and detents on said rod for holding said fingers out of use when swung away from the platen, said springs also acting on said detents.

35. In a typewriting machine, the combination of a traveling carriage, a platen, a carriage-carried ribbon, means for feeding said ribbon, and a plurality of means for actuating the means for feeding said ribbon, each of said plurality of means operating automatically.

36. In a typewriting machine, the combination of a traveling carriage, a platen, a carriage-carried ribbon, means for feeding said ribbon, and a plurality of means for actuating the means for feeding said ribbon, each of said plurality of means operating automatically, one of said means being hand operated and one being power operated.

37. In a typewriting machine, the combination of a traveling carriage, a platen, a carriage-carried ribbon, a ribbon feeding clutch device, pawl and ratchet devices for line spacing said platen, and a plurality of means for actuating both of said ribbon feeding and line spacing devices, one of said means being hand operated and the other being power operated.

38. In a typewriting machine, the combination of a carriage, a platen thereon, a carriage-carried ribbon, a ratchet wheel connected to the platen, a co-operating pawl, a bell crank connected to said pawl, and a plurality of means for actuating said bell crank, one of said means being hand actuated and the other being power operated, both of said means being effective to feed said ribbon.

39. In a typewriting machine, the combination of a carriage, a platen, a carriage-carried ribbon, means for line spacing said platen, a ribbon-feeding clutch device, and a ribbon feeding slide connected to said line spacing means and to said device.

40. In a typewriting machine, the combination of a carriage, a platen, a carriage-carried ribbon, means for line spacing said platen, a slide connected to said line spacing means, and co-acting jaws on said slide, said jaws co-operating to engage the ribbon and feed it when said slide is actuated in one direction.

41. In a typewriting machine, the combination of a carriage, a platen, a carriage-carried ribbon, means for line spacing said

platen, a slide connected to said line spacing means, and co-acting jaws on said slide, said jaws co-operating to engage the ribbon and feed it when said slide is actuated in one direction, said jaws relaxing to slide inoperatively over the ribbon during return movements of said slide.

42. In a typewriting machine, the combination of a carriage, a platen, a carriage-carried ribbon, means for line spacing said platen, a slide connected to said line spacing means, a rigid jaw on said slide and a pivoted co-acting jaw also on said slide and constantly spring-pressed into engagement with said rigid jaw, said jaws co-acting operatively only during movement of said slide in one direction.

43. In a typewriting machine, the combination of a carriage, a platen, a carriage-carried ribbon, means for line spacing said platen comprising a hand operated rock shaft, a crank arm on said rock shaft, a link connected to said crank arm, a slidable plate mounted on said carriage and connected with said link, and co-acting jaws on said slide between which one of the plies of the ribbon passes.

44. In a typewriting machine, the combination of a carriage, a platen, ribbon guides for an endless ribbon mounted on said carriage, said guides being so arranged that the ribbon is disposed in two long parallel plies, one of which is contiguous to and longitudinal of the platen, and the other of which is forward of the first ply, line spacing devices, a ribbon slide operatively connected thereto, and co-acting jaws on said slide between which the forward ply of the ribbon passes, said jaws co-operating to clamp the ribbon and feed it when the slide is moved in one direction, the jaws sliding inoperatively over said ply during return movement of said slide.

45. In a writing machine, the combination of a carriage, a platen, ribbon guides for an endless ribbon mounted on said carriage, said guides being so arranged that the ribbon is disposed in two long parallel plies one of which is contiguous and longitudinal

of the platen and the other of which is forward of the first ply, and feeding means for the ribbon that contacts directly with the forward ply.

46. In a writing machine, the combination of a carriage, a platen, ribbon guides for an endless ribbon mounted on said carriage, said guides being so arranged that the ribbon is disposed in two long parallel plies, one of which is contiguous and longitudinal of the platen and the other of which is forward of the first ply and feeding means including an engaging device on the carriage for operatively engaging the forward ply and moving it in lengthwise direction.

47. In a writing machine, the combination of a carriage, a platen, a bail mounted on said carriage, ribbon guides for an endless ribbon mounted on said bail and so disposed that the ribbon extends in two long plies lengthwise of the platen, and ribbon feeding means comprising a device mounted on said bail and directly engaging one of said plies.

48. In a writing machine, the combination of a carriage, a platen, a bail comprising a rock shaft mounted on said carriage, ribbon guides for an endless ribbon mounted on said bail and so disposed that the ribbon extends in two long plies lengthwise of the platen, and a feed slide mounted on said rock shaft and engaging one of said plies.

49. In a writing machine, the combination of a platen, a carriage therefor, a bail comprising a rock shaft mounted on said carriage, ribbon guides for an endless ribbon mounted on said bail and so disposed that the ribbon extends in two plies lengthwise of the platen, and a feed slide mounted on said rock shaft and engaging one of said plies, said slide maintaining its relationship with the ribbon plies when said bail is rocked.

Signed at borough of Manhattan, city of New York, in the county of New York, and State of New York, this 7th day of August, A. D. 1925.

FREDERICK A. HART.