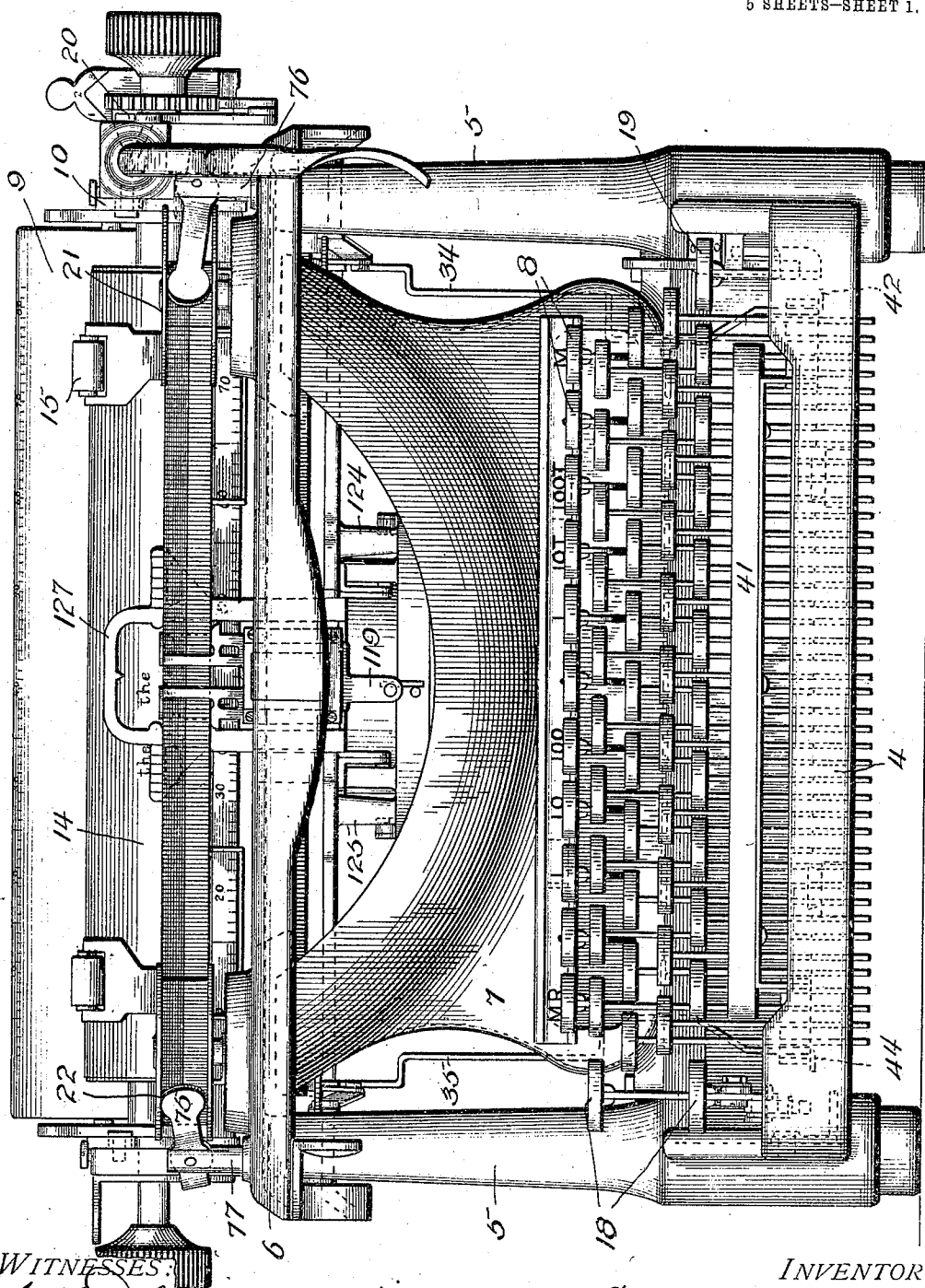


990,917.

C. SPIRO.
RIBBON MECHANISM.
APPLICATION FILED JULY 29, 1910.

Patented May 2, 1911.

5 SHEETS—SHEET 1.



WITNESSES:
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FIG. 1.

BY

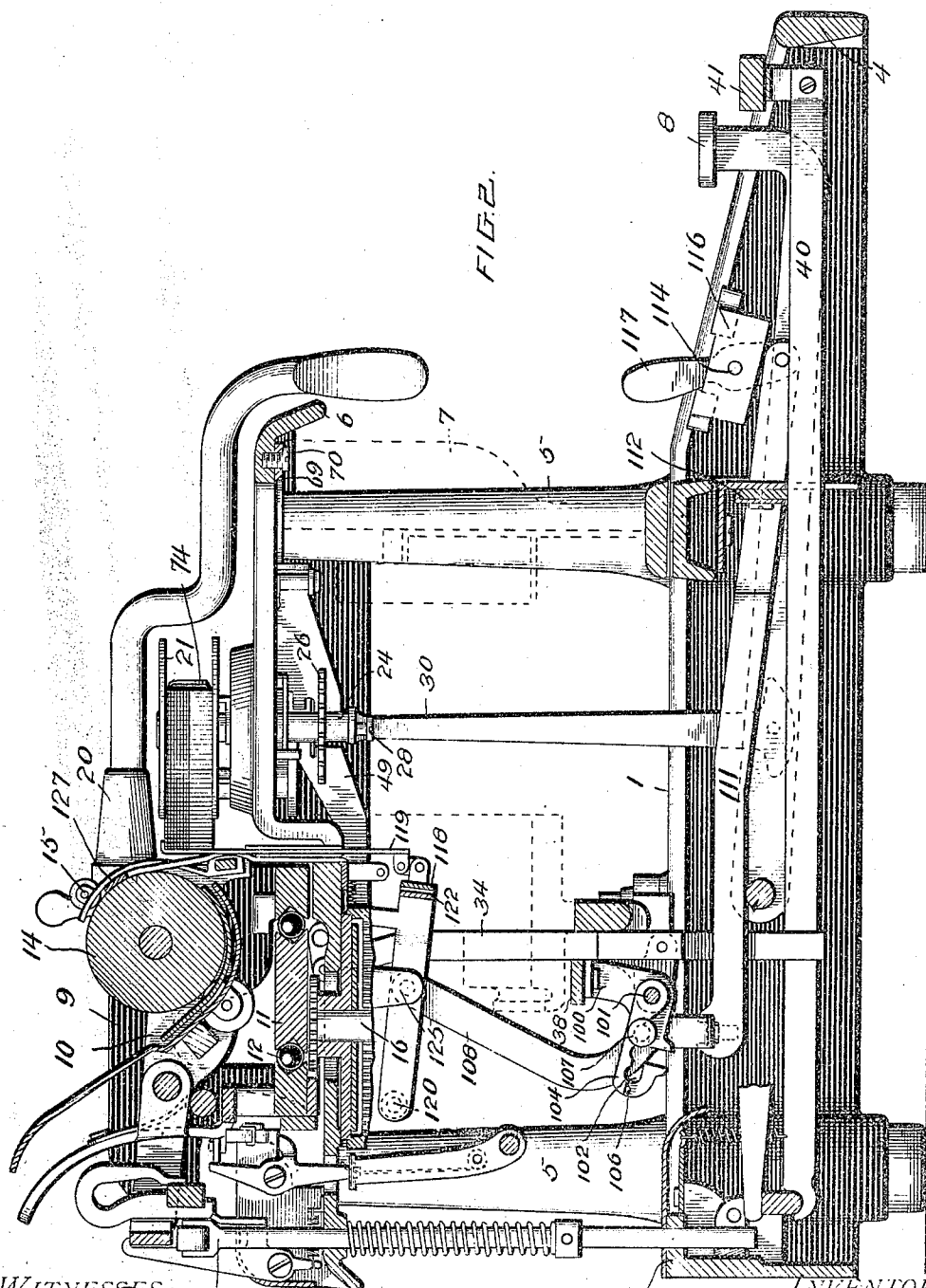
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5 SHEETS—SHEET 2.



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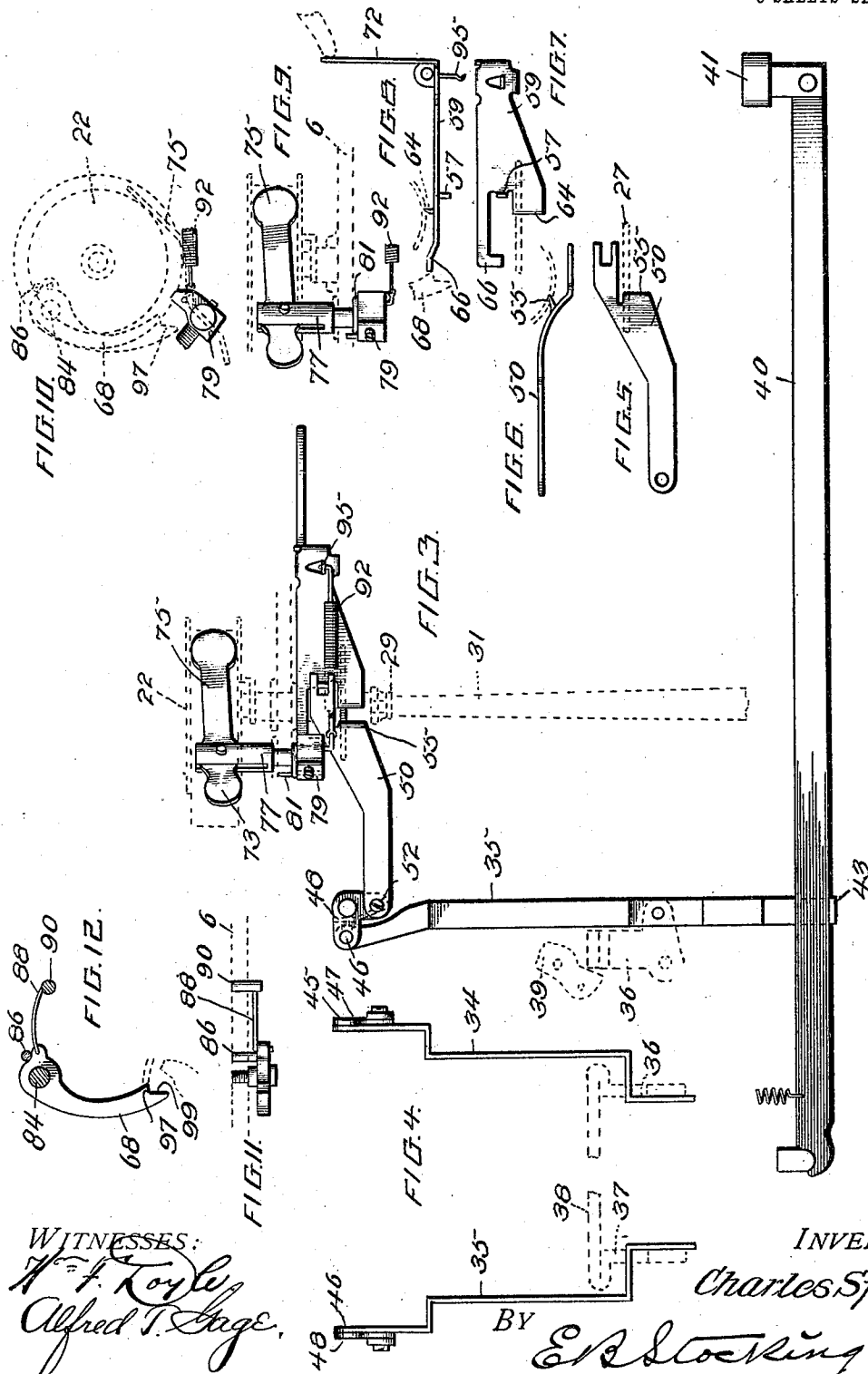
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5 SHEETS-SHEET 3.



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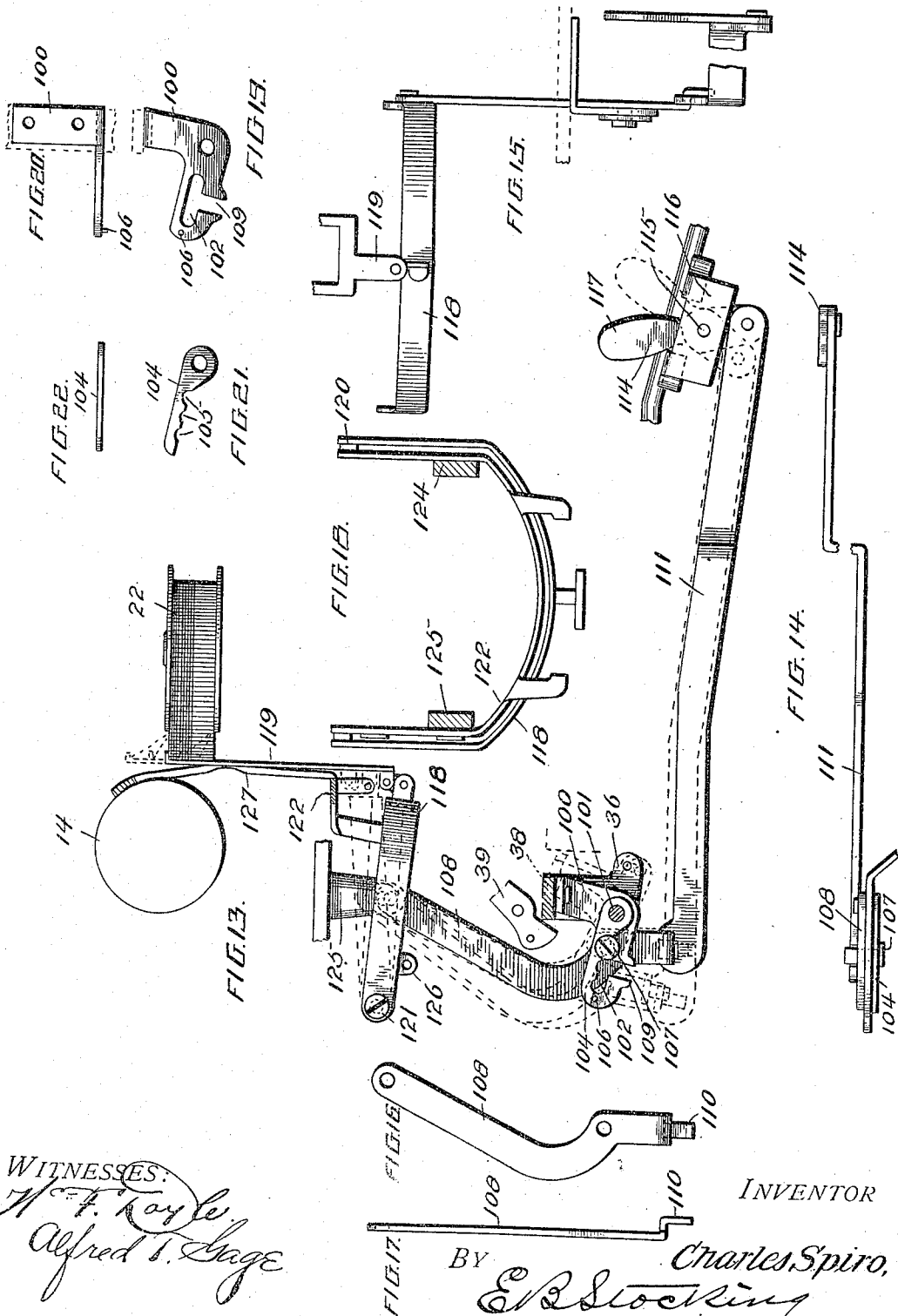
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5 SHEETS—SHEET 4.



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Patented May 2, 1911.
5 SHEETS—SHEET 5.

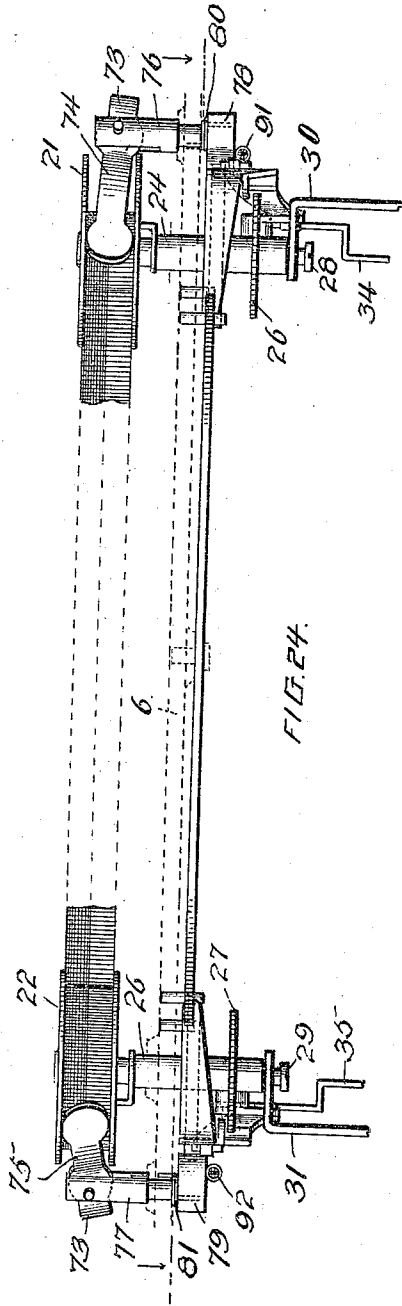


FIG. 24.

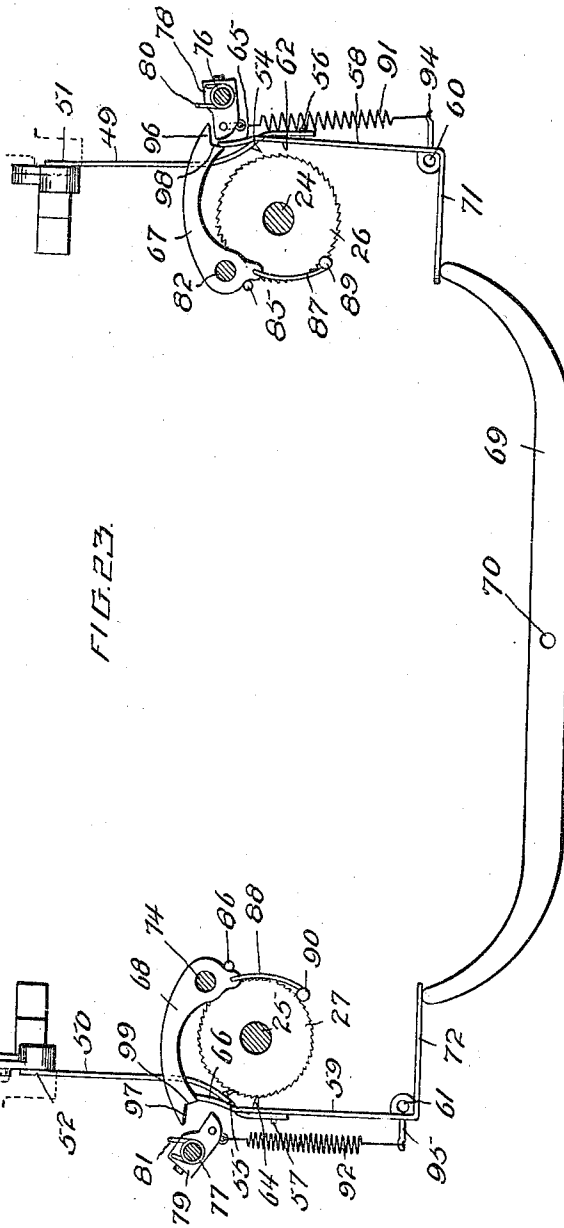


FIG. 23.

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UNITED STATES PATENT OFFICE.

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RIBBON MECHANISM.

990,917.

Specification of Letters Patent.

Patented May 2, 1911.

Application filed July 29, 1910. Serial No. 574,523.

To all whom it may concern:

Be it known that I, CHARLES SPIRO, a citizen of the United States, residing at New York, county of New York, State of New York, have invented certain new and useful Improvements in Ribbon Mechanism, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates broadly to the art of typewriting machines and specifically to ribbon mechanism adapted for use particularly upon the front strike type of typewriting machines.

The principal object of this invention is to construct a novel and simple ribbon mechanism for front strike machines in such manner that the longitudinal movement of the ribbon is automatically reversed when a pre-determined amount of ribbon is rolled upon the winding spool.

A further object of this invention is to construct a ribbon mechanism for typewriting machines wherein the longitudinal movement of the ribbon may be quickly and easily changed at the will of the operator, and may also be automatically changed when a predetermined amount of ribbon has passed the printing point.

Another object of this invention is to provide a ribbon mechanism for typewriting machines wherein a multi-color ribbon may be easily and quickly shifted in such manner that pre-determined portions will be presented and located over the printing point during the printing operation.

Another object of this invention is to provide a ribbon mechanism with a ribbon vibrator having the upper portion thereof so constructed as to form an erasing guide and also a line indicator for the printing point.

Another object of this invention is to provide a ribbon mechanism wherein the amount of movement or throw of the ribbon vibrator may be pre-determined at the will of the operator.

Another object of this invention is to construct a ribbon mechanism wherein the majority of the elements thereof are formed from stamped sheet metal parts.

A still further object of this invention is

to construct a ribbon mechanism in such manner that a light friction brake is at all times applied to the ribbon in such manner as to prevent the ribbon from becoming slack or loose because of unwinding too rapidly from the free ribbon spool during the printing operation.

Still other and further objects of this invention will in part be obvious and will in part be pointed out in the specification hereinafter by reference to the accompanying drawings wherein like numerals are used to indicate like parts, and the scope of the invention will be more specifically pointed out by the appended claims.

Figure 1 is a front elevational view showing the relationship of the ribbon spools, vibrator and attendant mechanisms, with regard to the other members of the typewriting machine. Fig. 2 is a view showing a typewriting machine in sectional elevation taken on the center plane of the machine and showing the relationship of the various elements in the ribbon mechanism. Fig. 3 is a detail view showing the ribbon mechanism actuating devices as connected to the spacing bar. Fig. 4 is a detail elevational view of the actuating links. Fig. 5 is a detail view showing one of the actuating dogs in elevation. Fig. 6 is a plan view of the dog shown in Fig. 5. Fig. 7 is a detail view showing one of the holding dogs in elevation. Fig. 8 is a plan view of the holding dog shown in Fig. 7. Fig. 9 is a detail view showing one of the reverse levers in elevation. Fig. 10 is a plan view of the mechanism shown in Fig. 9. Fig. 11 is a detail view showing one of the dog retainers in elevation. Fig. 12 is a plan view showing the dog retainer illustrated in Fig. 11. Fig. 13 is a view showing the multi-color shift mechanism assembled. Fig. 14 is a plan view of a portion of the multi-color shift mechanism. Fig. 15 is a view showing a portion of the multi-color shift mechanism in front elevation. Fig. 16 is a view showing one of the connecting links in side elevation. Fig. 17 is a view showing the link illustrated in Fig. 16 in edge elevation. Fig. 18 is a plan view showing a portion of the rocker frames. Fig. 19 is a view show-

ing one of the actuating bell cranks in elevation. Fig. 20 is a plan view of the bell crank illustrated in Fig. 19. Fig. 21 is a view showing the detaining spring in elevation. Fig. 22 is a plan view of the part illustrated in Fig. 21. Fig. 23 is a view showing the mechanism for reversing the longitudinal movement of the ribbon in assembled relationship. Fig. 24 is a view showing the mechanism illustrated in Fig. 23 in elevation.

Referring particularly to Figs. 1 and 2 of the drawings, it will be noted that several features of the typewriting machine are illustrated which do not specifically cooperate with the ribbon mechanism, but these features and elements are illustrated for the purpose of showing generally the relationship of the ribbon mechanism to the general construction of the typewriting machine. The portions of the typewriter which do not relate specifically to the ribbon mechanism will be described hereinafter in a general sense, the specific description appertaining particularly to the especial mechanisms embodying the construction used in the ribbon actuating devices. However, I desire that it shall be understood that such portions of the typewriter which do not pertain to ribbon mechanism, are not claimed in this application.

Referring more particularly to Figs. 1 and 2 of the drawings, the machine frame comprises a main portion which includes sides 1, rear portions 2, front bar 4, and supporting posts 5, upon which is mounted a top plate 6. A front board or plate 7, is mounted in the rear of a key board 8, and protects the general type bar construction, not shown in the drawings. A platen carriage 9, which supports the shifting carriage frame 10, is mounted for reciprocation upon a carriage bed 11, by means of bearing balls 12, which are adapted to run in accurately machined grooved ball races. The shifting carriage frame 10, supports a platen 14, and a paper feeding device 15. The platen carriage 9 is adapted to be driven by means of carriage propulsion mechanism 16, which is supported by the top plate 6, in such manner as to have operative connection with the platen carriage 9. Shifting mechanism 17, is arranged at the rear of the machine and is operatively connected with shift keys 18 and 19, in such manner as to cause the shifting carriage frame 10 to be raised and lowered at the will of the operator in order to position the platen 14 in the different printing positions. Line spacing mechanism 20, is arranged at the right of the carriage frame in order to enable the platen to be turned for line spacing. As the above set forth mechanisms do not specifically form a portion of this invention, further and more detailed explanation is thought to be unnecessary,

and therefore attention will now be directed specifically to the ribbon mechanism.

Referring more particularly to Figs. 2, 3, 13, 23 and 24, the ribbon mechanism comprises ribbon spools 21 and 22, that are mounted to rotate upon vertical stub shafts 24 and 25 respectively. Each of the stub shafts 24 and 25, carries fixedly mounted thereon ratchet wheels 26 and 27 respectively, and are provided at their lower ends with stud screws 28 and 29, which are adapted to pass through vertical shift links 30 and 31, which are connected with the platen shifting mechanism and cause the ribbon spools to be shifted in a vertical direction when the platen carriage is shifted from one printing position to another. As this specific mechanism is claimed in a separate application filed August 4, 1910, Serial No. 575,523, further description of the shifting features of the ribbon spools is omitted from this application. Vertical actuating links 34 and 35, are pivoted to the actuating bell cranks 36 and 37, upon which the universal bar 38 is fixedly mounted in such manner that the actuating links 34 and 35 are moved vertically for each actuation of the universal bar when moved under the influence of a sub-lever 39, (one of which is illustrated in Fig. 13) during the printing operation. In order that the vertical links 34 and 35 may be actuated when a spacing bar 40 is operated, by striking the finger key 41 formed upon the forward end thereof, the lower ends of these links are provided with offset portions 42 and 43, which are adapted to pass under the arms 40 of the spacing bar, and to thereby form an operative connection between the spacing bar and the actuating links. The actuating links 34 and 35 are supported at their upper ends by being pivotally connected as at 45 and 46, to small bell cranks 47 and 48, which translate the vertical motion of the actuating links into a horizontal motion in order to operate actuating dogs 49 and 50, which are pivotally supported at their rear ends as at 51 and 52, to the other arm of the bell cranks 47 and 48 respectively.

Referring particularly to Figs. 3, 23 and 24, it will be noted that the actuating dogs 49 and 50, which are formed of resilient sheet material, are provided with wide engaging faces 54 and 55, which are adapted to engage the teeth of the ratchet wheels 26 and 27 respectively. The forward ends of the actuating dogs 49 and 50, are bifurcated and are adapted to be guided by lugs 56 and 57, which are struck up integral from the sheet metal holding dogs 58 and 59. The ratchet wheels 26 and 27 are adapted to be held from retrograde movement when under the influence of the actuating mechanism, by means of the hereinbefore

mentioned holding dogs 58 and 59, which have engaging faces 62 and 64, that are adapted to co-act with the teeth of the ratchet wheels. The holding dogs 58 and 59, are formed in the manner of right angle bell cranks and are pivoted to the top plate 6, as at 60 and 61. The holding dogs 58 and 59, are provided with rear extensions 65 and 66, which are constructed in such manner as to be adapted to co-act with dog retainers or latch members 67 and 68, for a purpose which will be more specifically described hereinafter. A connecting yoke or lever 69, is pivotally attached to the top plate 6, as at 70, and is adapted to contact with the inner end bell crank portions 71 and 72 of the holding dogs 58 and 59, in such manner as to cause one pair of actuating holding dogs to be disengaged from their companion ratchet wheel when the other pair of actuating dogs is thrown in engagement with the other of the ratchet wheels, by means of mechanisms which will now be more specifically described.

Referring particularly to Figs. 3, 9, 23 and 24, follower members 74 and 75 are pivotally mounted upon short stub shafts 76 and 77 respectively, in such manner as to permit of a vertical movement of the ribbon spools during the shifting movement hereinbefore mentioned. The stub shafts 76 and 77 are mounted for rotation in the top plate 6, and carry on their lower ends cam members 78 and 79. The forward ends of the followers 74 and 75, are lightly spring pressed against a roll of ribbon carried by the ribbon spools 21 and 22, by means of light coiled springs 80 and 81, in such manner that the position of the cam members is determined by the amount of ribbon which is wound on the spools. The rear ends of the follower members 74 and 75, are provided with thumb pieces 73, in order that the followers may be manually actuated to cause the parts to be thrown in position to reverse the ribbon. Dog retainers or latch members 67 and 68 hereinbefore mentioned, are pivotally mounted as at 82 and 84, to the top plate 6, and are resiliently held with their inner ends in contact with stop pins 85 and 86, by means of spring members 87 and 88, which are carried upon stud pins 89 and 90, that are set in the top plate 6 of the machine frame. Light coiled spring members 91 and 92, are connected at one end with the cam members 78 and 79, and at their opposite ends with attaching hooks 94 and 95, that are formed integral with the holding dogs 58 and 59. The outer ends of the dog retainers or latch members 66 and 67, are provided with double faces as at 96, 97, 98 and 99 respectively. The faces 96 and 97 are adapted to cooperate with the outer ends of the cam members 78 and 79, while the faces 98 and 99 are adapted to co-operate with the rear extensions 65 and 66 of the holding dogs in such manner as to retain one pair of dogs *i. e.*, a holding dog and an actuating dog out of engagement with their respective ratchet wheel when it is desirable that the ribbon should be wound upon the opposite ribbon spool. It will be noted that as the ribbon is wound from one spool to the other, the follower member moves inward on the unwinding spool, carrying with it the cam member which is attached to the follower stub shaft. In so doing it will be noted that the coiled spring attached to the cam member and to the particular holding dog will be continually brought under greater tension. The movement of the several parts is directly opposite with reference to the ribbon spool upon which the ribbon is being wound, and this particular coiled spring it will be noted, is brought under less and less tension. When the ribbon has been sufficiently unwound from the free spool as to allow the cam member attached to this particular follower to engage the face on the dog retainer, the said dog retainer will be forced rearwardly sufficiently to release the holding and actuating dogs, which will be thrown into engagement with the particular ratchet wheel because of the excess tension in the coiled spring connecting the cam member and the holding dog, as compared to the tension of the cam member and the holding dog which are beneath the full ribbon spool. As the actuating dog and the holding dog are thrown into engagement with one ratchet wheel, the actuating dog and holding dog are disengaged from the opposite ratchet wheel because of the operation of the connecting yoke or bar 89. It will be noted that the engaging faces 54 and 55 on the actuating dogs and also the engaging faces 62 and 64 on the holding dogs, are of a sufficient width to engage the ratchet wheels in either of the several positions to which the ribbon spools may be shifted in a vertical direction because of the shifting mechanism hereinbefore mentioned.

Having described the actuating mechanism for the ribbon spools, attention is particularly called to Figs. 2, 13, 15 and 18, which refer specifically to the actuating mechanism for the ribbon vibrator or shuttle and to the devices whereby the shuttle is vibrated to different printing positions in order to position various portions of multi-color ribbon over the printing point. A bell crank member 100, is attached to the universal bar 38, and is mounted to rotate about a pivot member 101, which is axially aligned with the axis upon which the universal bar is mounted to turn. The horizontal portion of the bell crank member is provided with a T-shaped open slot 102, and carries a resilient detaining spring member

104, which has three detention notches 105, in its under surface. The outer end of the resilient member 104 is adapted to contact against a small stop pin 106. A stud screw 107, is carried by a vertical connecting link 108, and is adapted to be maintained in either of the detaining notches in the resilient spring member 104. The relationship of the detaining notches 105 on the resilient 5
10 detaining spring member 104, is such that the middle notch is directly over the open portion 109 of the slot 102. The vertical connecting link 108, is formed with an offset depending portion 110 on its lower end, 15
15 which is adapted to lie within a slot formed in the outer end of a controlling link 111, which passes through an opening in the key lever guide frame 112, and is connected at its outer end with an operating lever 114, 20
20 that is pivotally mounted as at 115, to a bracket 116, which is attached to the side wall 1 of the machine frame, and is provided on its upper end with a finger piece 117, which enables the operator to position the 25
25 several parts in order to regulate the ribbon throw for various multi-color changes in a manner hereinafter to be described. The length of the depending portion 110 on the 30
30 the slot in the controlling link 111, is such as to permit of a vertical movement of the actuating link without the disengaging of the connecting link 108 from the controlling link 111. The upper end of the vertical 35
35 connecting link 108 is pivotally attached to a yoke 118, which carries the ribbon shuttle or vibrator 119 pivotally mounted upon the front portion thereof. The yoke 118 is supported at its rear ends by being pivotally 40
40 attached as at 120 and 121 to the inner yoke 122, which is pivotally supported upon depending bracket members 124 and 125, that are made integral with the top plate 6, and is adapted to be held in definite relation to 45
45 the printing point by means of the platen shifting mechanism hereinbefore mentioned, which is connected to the inner yoke 122, by means of a depending lug 126. The inner yoke 122, carries upon its outer end a print- 50
50 ing point indicator and line finder 127, shown particularly in Figs. 1, 2 and 13. By actuating the finger piece 117, the vertical connecting link 108 is moved through the medium of the controlling link 111, in 55
55 such manner as to position the stud screw 107 in any one of the several detention notches 105, in the resilient detaining spring member 104. When the stud member is in the position shown in Fig. 13, that is, near- 60
60 est to the pivot 101, the ribbon throw will be actuated through a minimum amount of movement, and only the upper portion of the ribbon will be thrown over the printing point. When the stud screw 107 is retained 65
65 in the second notch, the bell crank member

100, upon being actuated, will not move the vertical connecting link 108, for the reason that the stud 107 will ride out through the open portion 109 of the slot 102, and when 70
70 the parts are in this particular relationship the type of the machine will strike without first striking the ribbon, and this position of parts is particularly adapted for making stencils to be used in mimeograph work. 75
75 As the stud screw 107 is moved to the third or extreme outer detaining notch, the ribbon shuttle or vibrator 119, will receive its greatest degree of movement and will carry the ribbon a sufficient distance over the 80
80 printing point to enable the type to strike at the lower portion thereof and thus will print from a different field of the ribbon than would be printed from if the stud screw 107 were in the first detaining notch.

Having thus described my invention what I desire to claim is:— 85

1. In a ribbon mechanism for typewriting machines, the combination of ribbon spools, a ribbon vibrator, means for actuating said ribbon vibrator, shafts upon which said ribbon spools are mounted, ratchet wheels fixedly mounted upon said shafts, holding dogs for said ratchet wheels, actuating dogs adapted to actuate said ratchet wheels, means for operating said actuating dogs, 90
90 and means controlled by the amount of ribbon on said ribbon spools for determining when one of said actuating dogs shall be rendered inoperative, said last mentioned means including opposed spring members, 95
95 the operative tension of each spring member being in inverse proportion to the amount of ribbon upon its respective ribbon spool. 100

2. In a ribbon mechanism for front strike typewriters, the combination of ribbon spools, a ribbon vibrator, means for actuating said ribbon vibrator, shafts adapted to carry said ribbon spools, ratchet wheels fixedly mounted upon said shafts, holding dogs adapted to cooperate with said ratchet wheels, actuating dogs arranged to actuate said ratchet wheels, pivotal means adapted to bear against the ribbon on said ribbon spools, means including opposed springs controlled by said pivotal means for rendering one of said actuating dogs inoperative, and means for operating said actuating dogs. 105
105

3. In a ribbon mechanism for front strike typewriters, the combination of ribbon spools, a ribbon vibrator, means for actuating said ribbon vibrator, vertical shafts adapted to carry said ribbon spools, ratchet wheels fixedly mounted upon said vertical shafts, holding dogs adapted to cooperate with said ratchet wheels, actuating dogs arranged to operate said ratchet wheels, pivotal followers adapted to bear upon the ribbon wound upon said ribbon spools, latch members adapted to retain said holding dogs and actuating dogs in inoperative position, 120
120 125
125 130

means operatively connected with said pivotal followers and adapted to cooperate with said latch members to release one holding and one actuating dog, opposed springs operatively connected with said last mentioned means and means for actuating said actuating dogs.

4. In a ribbon mechanism for front strike typewriters, the combination of ribbon spools, a ribbon vibrator, means for actuating said ribbon vibrator, vertical shafts adapted to carry said ribbon spools, pivotal followers adapted to bear against the ribbon on said ribbon spools, vertical shafts in which said pivotal followers are mounted, ratchet wheels operatively connected with said ribbon carrying shafts, holding dogs adapted to cooperate with said ratchet wheels, actuating dogs adapted to actuate said ratchet wheels, means for actuating said actuating dogs, latch members, cam members operatively connected with said follower carrying shafts and adapted to cooperate with said latch members, means for enabling one of said latch members to retain one holding dog and one actuating dog in inoperative position, and a yoke member operatively connecting said holding dogs.

5. In a ribbon mechanism for front strike typewriters, the combination of ribbon spools, a ribbon vibrator, means for actuating said ribbon vibrator, vertical shafts adapted to carry said ribbon spools, ratchet wheels mounted on said vertical shafts, actuating dogs adapted to cooperate with said ratchet wheels, holding dogs for said ratchet wheels, means for retaining one of said actuating dogs and one of said holding dogs in inoperative position, and means for actuating said retaining means to release said dogs, said last mentioned means including opposed springs, the effective strength of each spring being inversely dependent upon the amount of ribbon on its respective ribbon spool, substantially as described.

6. In a ribbon mechanism for typewriting machines, the combination of ribbon spools, actuating means for said ribbon spools, tension springs arranged in opposing relationship, means controlled by the amount of ribbon on said ribbon spools for determining the effective strength of said tension springs, said means being operatively connected with said springs in such manner as to cause the tension strain in one of said springs to be increased, and the tension strain in the other of said springs to be decreased, and means for disengaging said actuating means from one of said ribbon spools.

7. In a ribbon mechanism for typewriting machines, the combination of ribbon spools, means for actuating said ribbon spools, said means including a pair of actuating dogs and a pair of holding dogs, means for ac-

tuating said holding dogs, spring controlled means for rendering one of said actuating dogs and one of said holding dogs inoperative, and means for rendering the effective tension of said spring controlled means inversely proportionate to the amount of ribbon on the respective ribbon spools.

8. A ribbon mechanism for a typewriting machine, including ribbon spools, means for actuating said ribbon spools, reversing means, said reversing means comprising oppositely arranged spring members, said reversing means including mechanism for rendering the effective tension of said spring members dependent upon the amount of ribbon on the respective ribbon spools, holding dogs, dog retaining members, and a yoke member operatively connecting said holding dogs.

9. A ribbon mechanism for typewriting machines, including ribbon spools, means for actuating said ribbon spools, reversing means, said reversing means including pivoted follower members adapted to bear upon the ribbon on said ribbon spools, holding dogs, cam members operatively connected with said follower members, spring members operatively connecting said cam members and said holding dogs, and a yoke member operatively connecting said holding dogs.

10. A ribbon mechanism for typewriting machines, comprising ribbon spools, actuating means for said ribbon spools, said actuating means including a universal bar, a link member operatively connected with said universal bar, a spacing bar, and means operatively connecting said operating link with said spacing bar, substantially as described.

11. A ribbon mechanism for typewriting machines, including a ribbon vibrator, a yoke member operatively connected to said ribbon vibrator, a universal bar, an actuating link, a slotted member, detaining means carried by said slotted member, means operatively connecting said actuating link with said detaining means, and means for determining the relationship of said actuating link with reference to said detaining means, substantially as described.

12. A ribbon mechanism for typewriting machines, including a ribbon vibrator, an inner yoke member pivotally mounted upon the machine frame, an outer yoke member pivotally mounted upon said inner yoke member and operatively connected to said ribbon vibrator, a universal bar, a slotted bell crank attached to said universal bar, an actuating link operatively connected to said slotted bell crank and to said outer yoke member, and manually controlled means for determining the relationship of said actuating link with reference to said slotted bell crank, substantially as described.

13. A ribbon mechanism for typewriting

machines, including a ribbon vibrator, an inner yoke member pivotally mounted upon the machine frame, an outer yoke member pivotally mounted upon said inner yoke member, a universal bar, a slotted bell crank member operatively connected with said universal bar, an actuating link, means attached to said actuating link and adapted to cooperate with said slotted bell crank, a

thumb piece, and means connecting said thumb piece with said actuating link, substantially as described. 10

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES SPIRO.

Witnesses:

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