C. S. NICKERSON.

RIBBON MOVEMENT FOR TYPE WRITERS.

APPLICATION FILED NOV. 8, 1905.

915,037.

Patented Mar. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 2

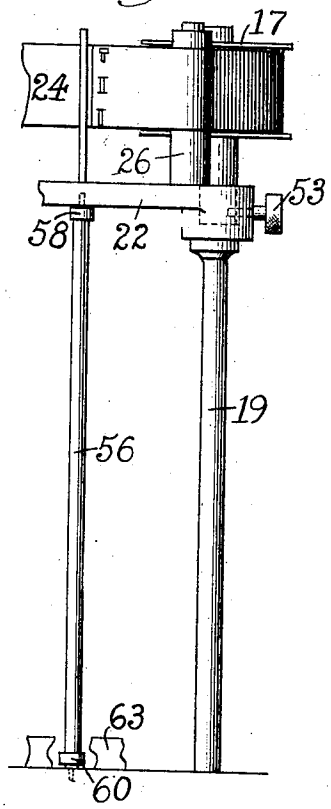
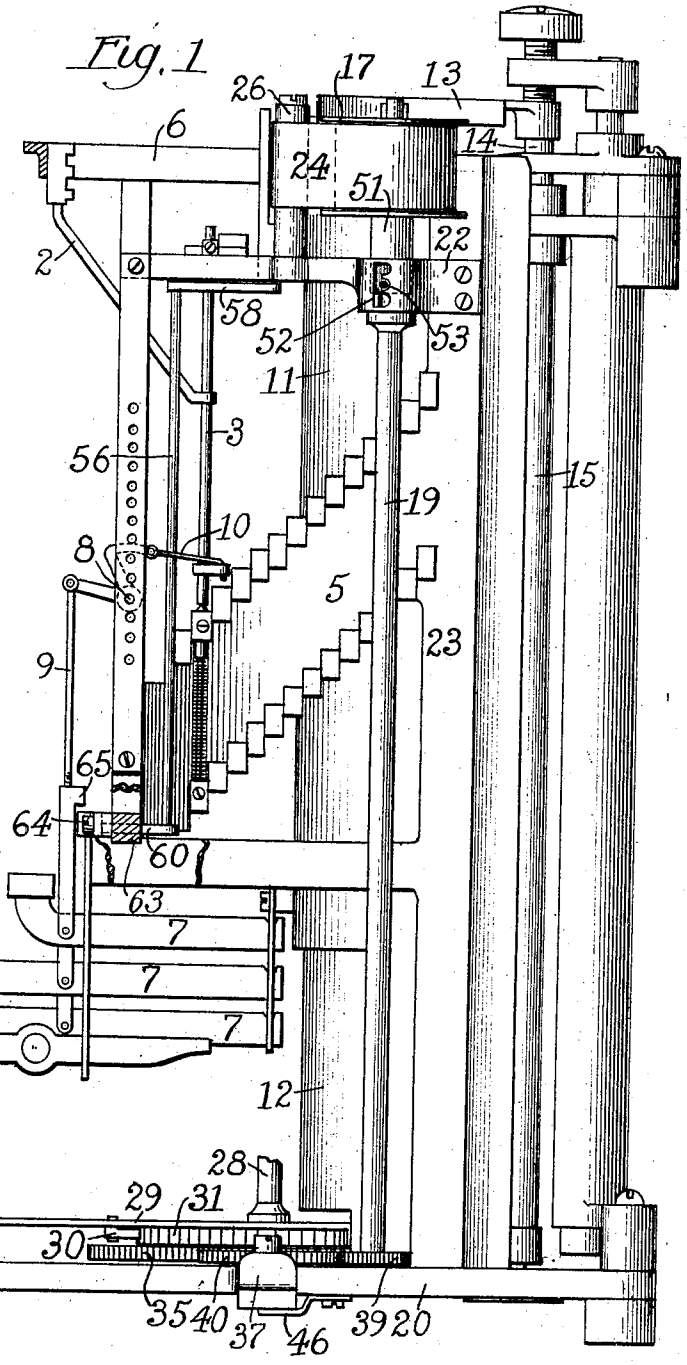


Fig. 1



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4 SHEETS—SHEET 2.

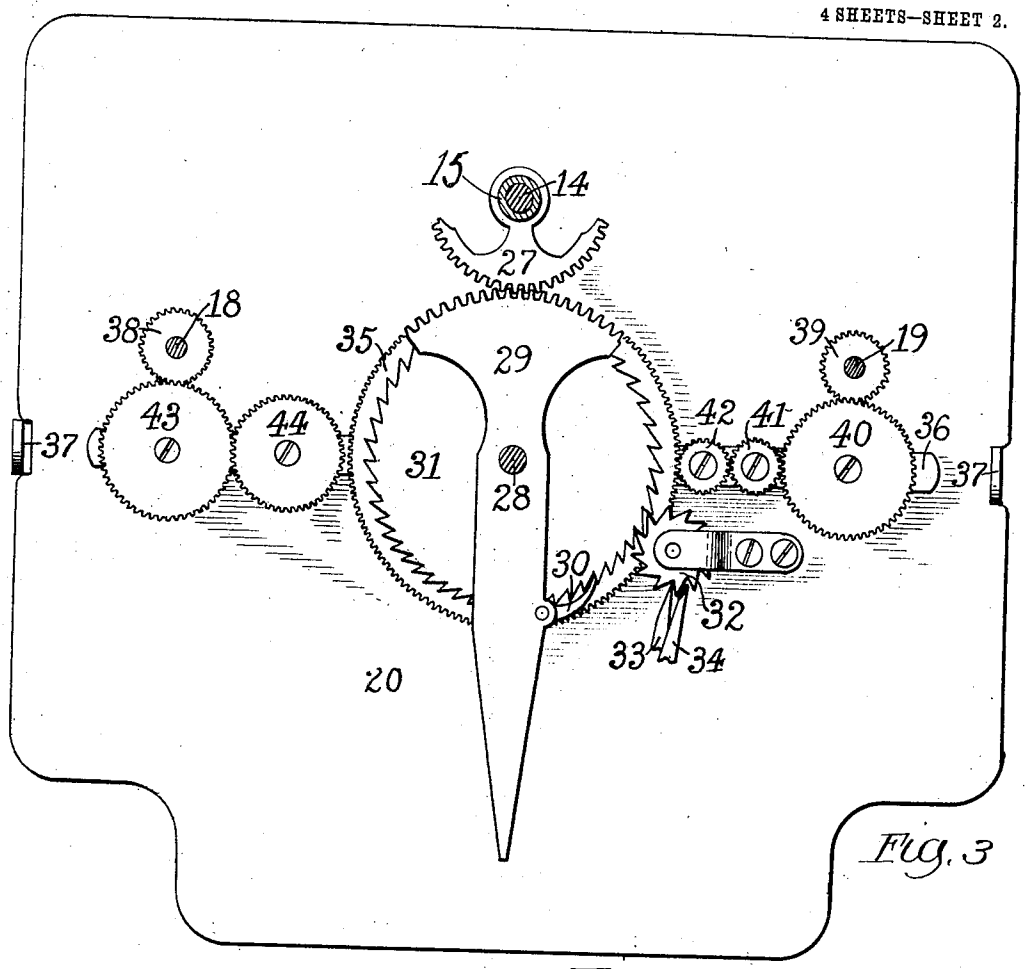
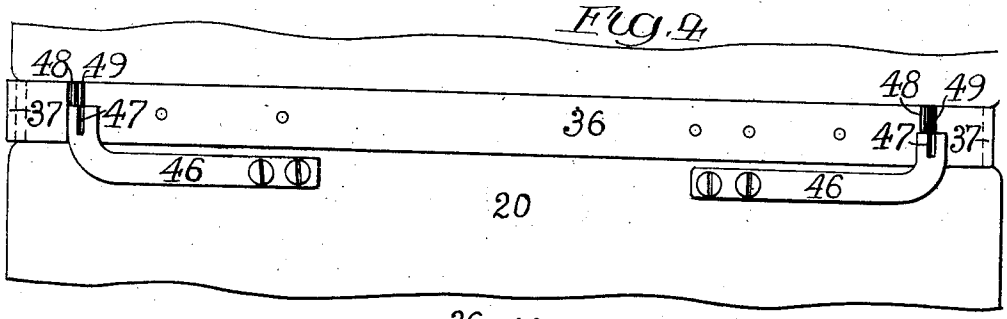


Fig. 3

Fig. 4



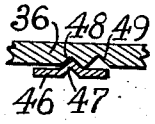


Fig. 5

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4 SHEETS—SHEET 3.

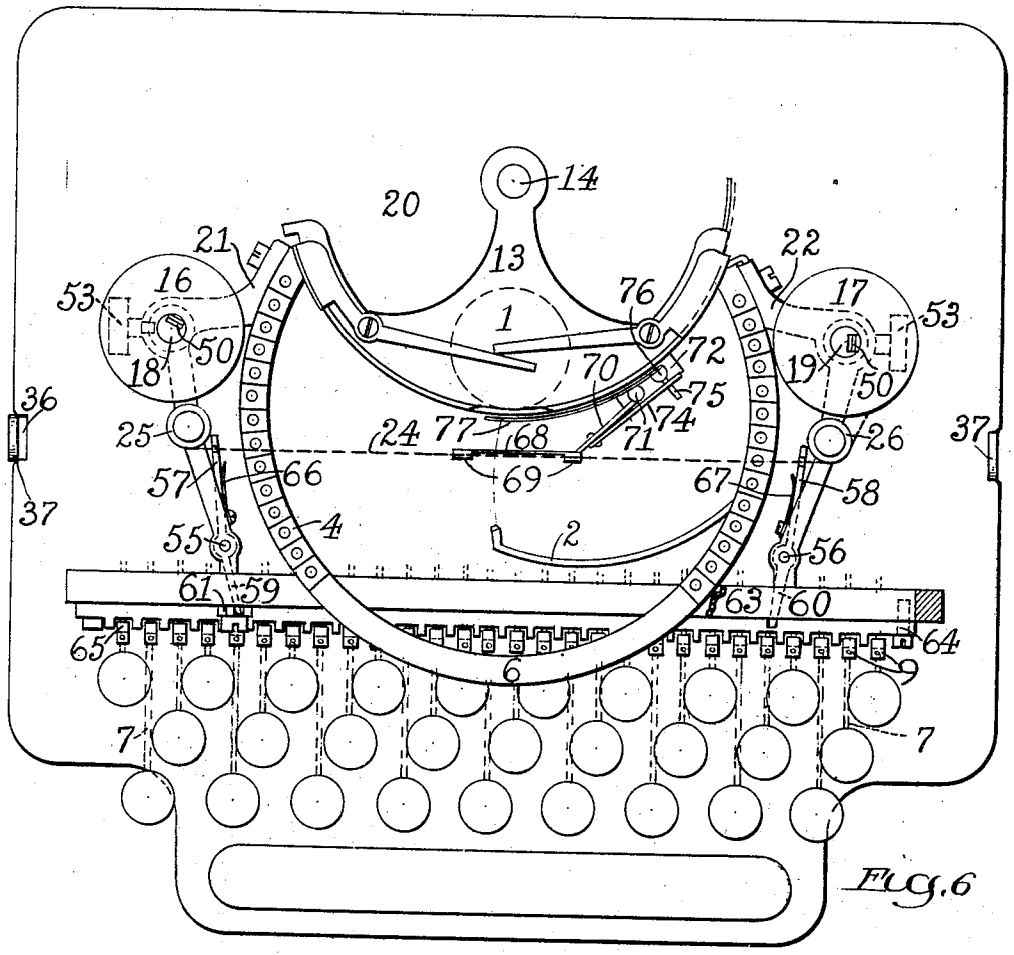


Fig. 6

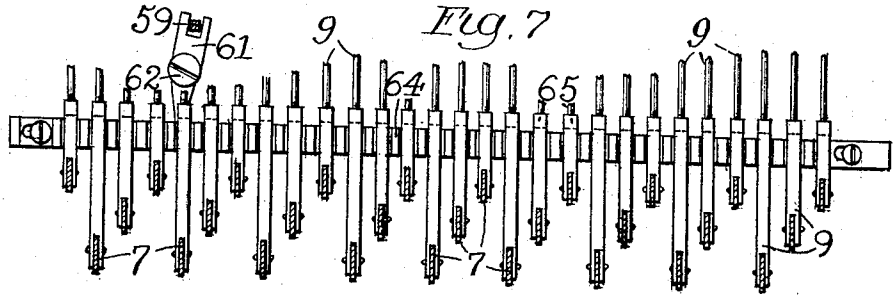


Fig. 7

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4 SHEETS—SHEET 4.

Fig. 8

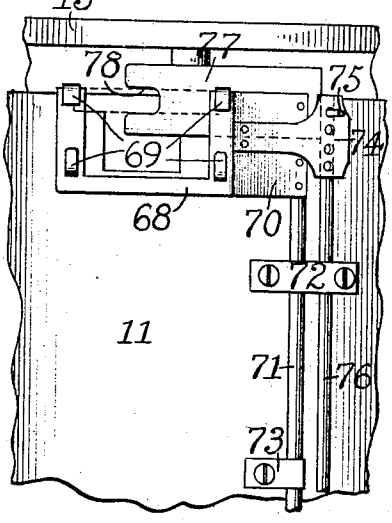


Fig. 9

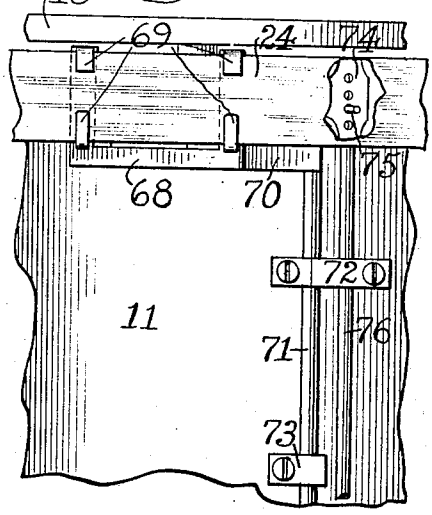


Fig. 10

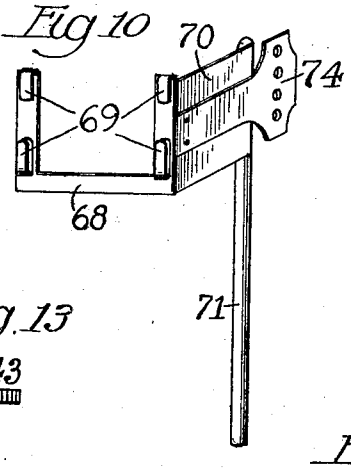


Fig. 12

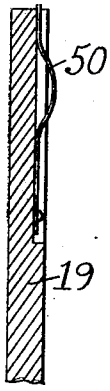


Fig. 11

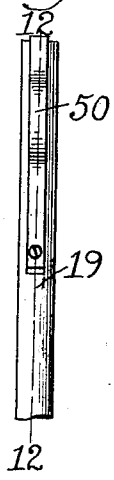


Fig. 13

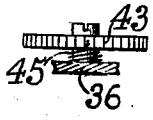
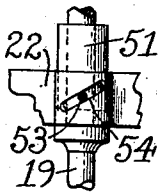


Fig. 14



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UNITED STATES PATENT OFFICE.

CHARLES S. NICKERSON, OF EVANSVILLE, INDIANA, ASSIGNOR TO NICKERSON TYPEWRITER COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN.

RIBBON-MOVEMENT FOR TYPE-WRITERS.

No. 915,037. Specification of Letters Patent. Patented March 9, 1909.

Application filed November 8, 1905. Serial No. 286,378

To all whom it may concern:

Be it known that I, CHARLES S. NICKERSON, a citizen of the United States, of Evansville, in the county of Vanderburg and State of Indiana, have invented certain new and useful Improvements in Ribbon-Movements for Type-Writers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to a ribbon-mechanism for type-writing-machines and it embraces improvements in means for giving motion to the ribbon-spools for feeding the ribbon past the printing point and for reversing the direction of the ribbon feed; in means for warning the operator when the ribbon is entirely unwound from one of the spools; in means for shifting the position of the ribbon, transversely with relation to the printing point, for the purpose of utilizing the whole of the ribbon and for writing in different colors by means of a ribbon inked in longitudinal bands of different colors; in means for preventing a heavily inked ribbon from blotting the paper, and in other details of construction in such mechanism.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

A ribbon mechanism embracing my invention may be applied to typewriting-machines of various forms. In the accompanying drawing, such ribbon-mechanism is illustrated in connection with a form of type-writing-machine such as is set forth in separate applications filed by me on the 29th day of November, 1904 Serial Number 234,705, and on the 7th day of August, 1905, Serial Number 273,067, and in an application Serial No. 286,379 filed at the same date as this one.

No reference is made herein to parts not necessary to an understanding of the ribbon-mechanism.

In said drawings:—Figure 1 is an elevation of the main parts of the machine as viewed from the right. Fig. 2 is a front elevation of the right-hand ribbon spool and the arm for locking the keys of the machine when the end of the ribbon is reached. Fig. 3 is a plan view of the base plate of the machine showing the driving gears and their connections. Fig. 4 is a view from beneath of the sliding bar for reversing the direction of the ribbon. Fig. 5 is a sectional view of the V-shaped grooves and the clamping springs for holding the sliding bar in its two positions. Fig. 6 is a plan view of the machine showing the ribbon, the ribbon-spools and the ribbon-guide. Fig. 7 is a view in front elevation of the connecting-rod, blocks attached to the keys of the machine, and the key locking device. Fig. 8 is a front elevation of the ribbon guide attached to the ribbon-shield which shifts with the platen, the ribbon-guide being shown in its lowermost position relatively to the said ribbon shield and the ribbon being removed. Fig. 9 is an elevation of the ribbon-guide in the medium position. Fig. 10 is a perspective view of the ribbon-guide. Fig. 11 is an enlarged detail elevation of the upper end of a spool-shaft, showing the spring for holding the ribbon-spool to the shaft. Fig. 12 is a section of the upper end of a spool shaft, taken on line 12—12 of Fig. 11. Fig. 13 is an elevation of one of the geared driving wheels, showing the spring for keeping the ribbon taut. Fig. 14 is an elevation showing one form of slot in the bearing blocks for locking the movable bearing sleeve for elevating or lowering the ribbon spool.

As shown in the said drawings, 1 indicates the platen of the machine which constitutes the support against which the paper rests in the operation of printing, and 2, 2 indicate type-bars which are arranged in two groups at opposite sides of the printing or impression point of the platen and with their pivotal axes arranged vertically. Said type-bars are attached to upright pivot rods 3, 3 which are mounted in upper and lower segmental frame members 4 and 5 located at opposite sides of the machine.

6 indicates a curved or segmental rest for the type heads against which the same bear when in their retracted positions.

The type-bars are operated from the key-levers 7 7 of the machine by means of horizontal rock-shafts 8, which have rigid arms connected by upright rods 9 with the key-levers and by horizontal rods 10 with rigid arms on the pivot-rods 3.

The platen 1 illustrated constitutes part of the paper supporting and actuating device shown in my separate applications hereinbefore referred to. Said platen consists of a

wheel or disk arranged horizontally and turning on a vertical axis, said wheel or disk having a narrow marginal or working face, wide enough only to receive the impression of one of the types on the type-heads. The platen thus constructed is actuated to move vertically by a platen shift device which also gives vertical movement to the paper, and which is so constructed that both the platen and paper have a rising and falling movement, by which the narrow face of the platen is brought into position for contact therewith of one or the other of vertically spaced types with which each of the several heads is provided. In the paper supporting and actuating device shown in the drawings, moreover, the sheet of paper is held or confined between two stationary, parallel, guide plates 11 and 12 having the form of segments of upright cylinders by which the paper is caused to move into a curved path as it is moved past the platen in letter-spacing. The paper supporting and actuating devices illustrated also include an oscillating and vertically movable paper supporting and actuating segment 13 which swings on a vertical axis and to the curved margin of which the upper edge of the paper is fastened. Said segment 13 is attached to the upper end of a vertically movable, upright shaft 14 which is mounted in a hollow, vertical, rotative shaft 15; the said shaft 15 being turned step by step for letter-spacing by an actuating spring controlled by an escapement mechanism. The drawings illustrate parts of the devices shown in said separate application for giving vertical and oscillatory movement to the paper supporting segment 13 and for vertically shifting the platen 1 as required for printing from either one of the types on the type-heads, and also for giving line space movement to the segment 13 and the sheet held thereby, but inasmuch as these parts are fully described and illustrated in the said separate applications and constitute no part of the present invention, they need not be more fully herein described.

The ribbon-spools, as indicated by 16 and 17 are located at opposite sides of the paper guide segments 11 and 12 and are mounted upon the upper ends of upright shafts 18 and 19 which extend downwardly to and have bearing at their lower ends in the horizontal base plate 20 of the machine. The upper ends of said shafts have bearing in brackets 21 and 22 attached to frame standards 23 which rise from the base plate and support the rear ends of the segmental frame bars 4 and 5; said brackets being located below the spools.

24 indicates the ribbon which is wrapped at its ends upon the spools 16 and 17, and 25 and 26 indicate two upright guide rollers which are so placed as to hold the central part of the ribbon at some distance forward of the platen; said guide rollers being mounted on the forwardly extending ends of the brackets 21 and 22.

The mechanism for actuating the ribbon-spool shafts is constructed as follows: These devices, shown in Fig. 3 of the drawings, are located adjacent to the base plate of the machine, and are associated with the escape mechanism by which the turning of the segment 13, the shaft 14, and the shaft 15 for letter-spacing is controlled. The actuating spring operates on a gear segment 27 which is mounted on the shaft 15. Said gear segment 27 meshes with a sector 29 mounted to turn on a shaft 28 and having a forwardly projecting arm which carries a pawl 30 acting on a ratchet wheel 31 attached to said shaft 28. The turning of the shaft 15 under the action of the actuating spring is controlled by an escape wheel 32 which is driven by a ratchet wheel 31 on the shaft 28 and is engaged by escape pawls 33, 34.

The foregoing mechanism is fully illustrated and described in my application referred to above and need not be herein more fully set forth.

The gear wheel 35, on the shaft 28 is situated beneath and revolves with the ratchet wheel 31.

36 (Figs. 1, 3 and 4) is a horizontally arranged, endwise sliding bar, situated beneath the base plate of the machine and extending transversely thereof beneath the wheel 35. Said bar 36 has upturned ends 37, 37 which rise at the outer margins of the base plate 20. At opposite sides of the wheel 35, the bar 36 carries two groups of gear-wheels which are located above the level of the base plate, their supporting studs extending through a slot in said base plate, and which serve to transmit motion from said gear wheel 35 to gear wheels 38 and 39 attached, respectively, to the lower ends of the ribbon-spool shafts 18 and 19. In order that the two groups of gear-wheels at the right and left of the wheel 35 may drive the ribbon-spool shafts in opposite directions, and thereby enable the direction of the ribbon to be reversed, one of the groups of gear-wheels is provided with one more gear-wheel than the other. The two groups, are, moreover, so arranged on the endwise shifting bar 36 that one group is engaged with the gear wheel 35 at a time, the endwise shifting movement of the bar 36 serving to bring either the right or left hand group into operative connection with said wheel 35. The right-hand group is shown in the drawings as consisting of three gear-wheels 40, 41 and 42 of which the wheel 40 intermeshes with the spool shaft gear 39 and the wheel 42 is adapted to engage the wheel 35; while the left hand group consists of two gears 43, and 44 of which the wheel 43 intermeshes with the spool-shaft gear 38 and the

wheel 44 is adapted to intermesh with the gear wheel 35.

45 (Fig. 13) indicates a drag spring situated beneath the gear wheel 43 and between the same and the bar 36 to keep the inking ribbon taut in all positions, there being a similar drag beneath the gear wheel 40. For this purpose a drag spring may be located underneath or above any one wheel in each of the groups.

46, 46 indicate detent springs situated beneath and attached to the base plate of the machine and which press at their free ends against the bar 36 and are provided with V-shaped teeth 47 47 adapted to engage either one of two notches 48 and 49 in said bar to yieldingly hold the sliding bar in position, and permit it to be shifted back and forth as desired for the purpose of bringing the right or left group of gear wheels into engagement with the main gear wheel. The notches 48 and 49 are located at the distance apart required for giving the endwise movement of the bar 36, in order to effect the engagement of one or the other groups of gear wheels on said bar with the wheel 35, as shown in Figs. 4 and 5. When, therefore, the left group of gear wheels is in engagement with the gear wheel 35, the V-shaped teeth of the springs rest in the grooves 48, 48 of the sliding bar; and when the right group of gear wheels is in engagement with the said gear wheel, the said V-shaped teeth rest in the grooves 49, 49 of the said sliding bar.

The ribbon spools 16 and 17 have central apertures to receive the upper ends of the shafts 18 and 19 and are held upon the shafts by leaf-springs 50, 50, located in longitudinal recesses in the upper parts of said shafts, said springs having laterally bent parts which extend outside of the shafts, as shown in Figs. 11 and 12.

The inking ribbon 24 is inked in three longitudinal bands of different colors. The said ribbon is not attached directly to the ribbon-spools but is pinned or otherwise secured to two short connecting ribbons which are firmly secured to the hollow axes of the spools.

51, 51 indicate bearing sleeves surrounding the upper parts of the ribbon-spool shafts 18 and 19 below the ribbon spools, and in which said shafts revolve; said sleeves being adjustably secured in cylindric apertures in the brackets 21 and 22. Said sleeves 51, 51 are adapted for vertical adjustment in order that they may support the ribbon spools at different heights on the ribbon spool shafts. To afford such adjustment, the said brackets are provided with upright, laterally notched slots 52, 52 through which pass clamping screws 53, 53 that have screw-threaded engagement with the bearing sleeves. The springs 50 at the tops of the spool-shafts permit the ribbon spools to be elevated or lowered on the shafts and by their frictional engagement with the spools hold the said spools from turning in the shafts. In Fig. 14, one of the brackets 22 is shown as having an oblique slot 54 which may be used in place of the upright slot shown in the other figures of the drawing.

55, 56 indicate vertical shafts located at the left and right hand sides of the machine and having bearings at their upper ends in the brackets 21 and 22, and at their lower ends in the frame of the machine. To the upper end of said shafts are attached arms 57, 58 which project rearwardly from the shafts and which carry vertical forks through which the ribbon passes at points near the guide rollers. On the lower end of the vertical shafts 55, 56 are rigid, forwardly extending arms 59 and 60. The lower arm 59 of the left-hand vertical shaft is engaged with one end of a lever 61 which is pivotally mounted on a horizontal pivot stud 62 on the front of the machine frame, so that said lever swings in a vertical plane parallel with the front face of the machine frame. Mounted on a transverse, horizontal member 63 of the machine frame, at the front of the machine, is a transversely extending, horizontal, endwise movable locking bar 64 which is provided at its front edges with notches and intervening teeth, spaced to correspond with the upright connecting rods 9, 9, by which the type-bars are operated from the key-levers, the bar 64 being located behind and adjacent to the said connecting rods. The lever 61 and the lower arm 60 of the right vertical shaft are adapted to give longitudinal movement to the locking bar 64 between the teeth of which rearwardly extending lugs 65 on the connecting bars normally pass. By shifting the locking bar longitudinally, the teeth thereof are brought into position to prevent the downward movement of the said connecting rods and to thereby lock all of the key-levers of the machine. The pins or other fastening means connecting the ribbon 24 to the short connecting ribbons which are attached to the ribbon-spools are adapted to engage the upright, forked ends of the arm 57 or 58 when the end of the ribbon is reached, thereby moving the said arm toward the printing point and causing the lower arm 60 of the right vertical shaft 56 to shift the locking bar to the right, or the lower arm 59 of the left shaft 55 to operate the lever 61 to shift the said locking bar in the same direction.

66, 67 indicate flat leaf-springs attached to the brackets 21 and 22 and pressing outwardly against the upper arms 57 and 58 so as to hold the said arms in their normal positions except when the same are moved by the ribbon for locking the key-levers; the said arms returning to their normal positions when the direction of the ribbon feed is reversed by changing the position of the sliding

bar 36 on the base of the machine. As the locking bar will obstruct movement of the connecting rod lugs when shifted longitudinally either to the right or left, it is not necessary that the lever 61 should be provided for the purpose of shifting the said locking bar always to the right, but in practice it is found best to use the said lever.

The ribbon-guide, as a whole, is indicated by 68 (Figs. 6, 8, 9 and 10). Said ribbon guide is essentially a U shaped frame with its arms directed upwardly and provided with four upwardly and downwardly directed guide fingers 69, 69 which guide the ribbon. The U shaped frame is attached by an arm 70 to a vertical shaft 71 which slides vertically in guide blocks 72, 73 attached to the front paper guide 11. A flat spring 74 is attached to the arm 70 of the ribbon-guide in such a position as to extend laterally past the shaft 71. In the said spring are a plurality of vertically spaced holes adapted to engage a pin 75 which is secured in and projects laterally from an upright, vertically movable shaft 76 which slides in the guide block 72. Attached to the upper end of the shaft 76 is a ribbon-shield 77 of thin sheet metal, celluloid or similar substance which projects beyond the ribbon guide, and is provided at its left hand end with a slot 78, through which the type strike the platen. The vertically movable shaft 76 has vertical movement with the platen, as described in my simultaneously filed application and the ribbon-shield also moves vertically with said platen. By means of the spring 74 provided with holes which engage the pin 75 on the shaft 76 carrying the ribbon-shield, the ribbon-guide is moved with the ribbon-shield and the platen, and its vertical position relatively thereto may be adjusted. The adjustability of the ribbon-guide relatively to the platen enables the whole surface of the ribbon to be utilized in case of an ordinary ribbon, and also permits multi-color work to be done by the use of a ribbon inked in longitudinal bands of different colors.

I claim as my invention:—

1. A ribbon actuating and reversing device embracing ribbon-spool shafts provided with gear wheels, a rotative driving gear wheel actuated from the letter space mechanism of the machine, an endwise shifting gear-supporting bar, and gearing connecting the driving gear-wheel with said gear wheels on the spool-shaft, embracing two gear wheels mounted on the shifting bar and intermeshing with the gear wheels on the ribbon spool-shaft and two other gear wheels mounted on said bar at such distance apart that only one of said gear wheels will be engaged with the driving gear-wheel at one time.

2. A ribbon actuating and reversing device embracing ribbon-spool shafts provided with gear wheels, a rotative driving gear wheel actuated from the letter space mechanism of the machine, a shifting gear-supporting bar, and gearing for connecting the said driving gear-wheel with the gear wheels on the spool-shafts consisting of two groups of gears, containing an unequal number of gear wheels, each group embracing a gear wheel mounted on the shifting bar and adapted to be brought into and out of engagement with the driving gear wheel by the movement of said bar.

3. A ribbon actuating and reversing device, embracing ribbon-spool shafts provided with gear wheels, a rotative driving gear wheel, a shifting gear supporting bar, gearing connecting the driving gear wheel with the gear wheels on the spool shafts, embracing two gear wheels either of which may be engaged with the driving gear wheel by shifting said bar, and a spring detent for holding the said bar in either position to which it may be shifted.

4. The combination with key-levers, type-bars and connecting rods for actuating the type-bars from the key-levers provided with lateral lugs, of a locking bar adapted to engage the lugs on the connecting rods and means actuated by the ribbon for shifting said locking bar.

5. The combination with key-levers, ribbon spools and means for turning the said spools, of locking means for the key-levers embracing an endwise movable locking bar, and means for automatically actuating said locking bar embracing rock-shafts having operative connection with said locking bar and provided with forked arms which are engaged by the ribbon.

6. The combination with key-levers, ribbon spools, means for turning the ribbon-spools, an endwise movable, toothed locking bar for the key-levers and rock-shafts provided with forked arms engaged by the ribbon and with arms which have operative connection with said locking bar.

7. The combination with type-bars and key-levers, of connecting rods by which motion is communicated from the key-levers to the type-bars, said connecting rods being provided with lateral lugs, a toothed endwise movable locking bar adapted to engage said lugs, ribbon-spools, means for actuating said spools and rock-shafts provided with forked arms which are engaged by the ribbon and with rigid arms acting to give endwise movement to said locking bar.

8. The combination with upright ribbon shafts, bearings therefor, and ribbon-spools thereon, of means for shifting the ribbon spools endwise on the shafts, embracing sleeves surrounding the shafts in contact with the spools and having sliding engage-

ment with the ribbon-shaft bearings and means for adjustably securing the said sleeves in said bearings.

9. The combination with a ribbon-spool shaft, a slotted bearing therefor, and a spool mounted on the shaft, of a sleeve surrounding the shaft and having sliding engagement with the shaft bearing and a clamp-screw inserted through the slot in the shaft bearing and engaging the said sleeve.

10. The combination with a platen and type-bars, of two upright ribbon-spool shafts, ribbon-spools on said shafts, sleeves surrounding the shafts below the spools for supporting the said spools, said sleeves being vertically adjustable on the machine frame for changing the position of the ribbon relatively to the type-bars.

11. The combination with a platen and type-bar, of a ribbon spool, a ribbon-guide engaging the ribbon adjacent to and at opposite sides of the printing point and a ribbon shield consisting of a thin plate located between the path of the ribbon and the platen and which is supported at one end near the printing point and at its opposite end extends between the ribbon-guide and the platen, and is provided with a slot opposite the printing point.

12. The combination with a platen and a type-bar, of a shifting ribbon guide engaging the ribbon adjacent to and at opposite sides of the printing point, and a shifting ribbon shield consisting or a thin plate located between the path of the ribbon and the platen and which is supported at one end near the printing point and at its opposite end extends between the ribbon guide and the platen and is provided with a slot opposite the printing point, said shifting ribbon guide being movable with the shifting ribbon shield.

13. The combination with a platen and type-bar, of a shifting ribbon guide engaging the ribbon adjacent to and at opposite sides of the printing point, and a shifting ribbon shield consisting of a thin plate located between the path of the ribbon and the platen and which is supported at one end near the printing point and at its opposite end extends between the ribbon guide and the platen and is provided with a slot opposite the printing point, said shifting ribbon guide being connected with and having shifting movement with the ribbon shield.

14. The combination with type-bars and a platen, of a shifting ribbon-shield and a ribbon-guide which is adjustably connected with the ribbon-shield and shifts with the latter.

15. The combination with type-bars and a platen, of a ribbon-guide, a supporting rod for said ribbon-guide having endwise movement in a direction transverse to the ribbon, a shifting ribbon-shield, and an adjustable connection between said ribbon-guide and the ribbon-shield.

16. The combination with type-bars and a platen, of a ribbon-guide which is movable in a direction transverse to the ribbon, a ribbon-shield which is movable in a direction transverse to the ribbon, and an adjustable connection between the ribbon-guide and ribbon-shield, consisting of a pin in one of said parts and a spring-plate on the other part provided with a plurality of laterally spaced holes for engagement with said pin.

17. The combination with type-bars and a platen, of a shifting ribbon-guide, and a supporting rod for said guide having endwise movement on the machine frame in a direction transverse to the ribbon.

In testimony, that I claim the foregoing as my invention I affix my signature in presence of two witnesses, this 2nd day of November A. D. 1905.

CHARLES S. NICKERSON.

Witnesses:
C. CLARENCE POOLE,
G. B. WILKINS.