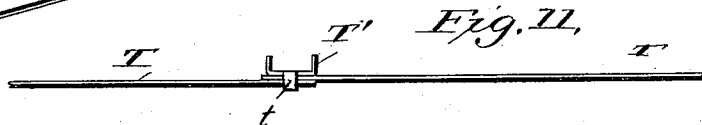
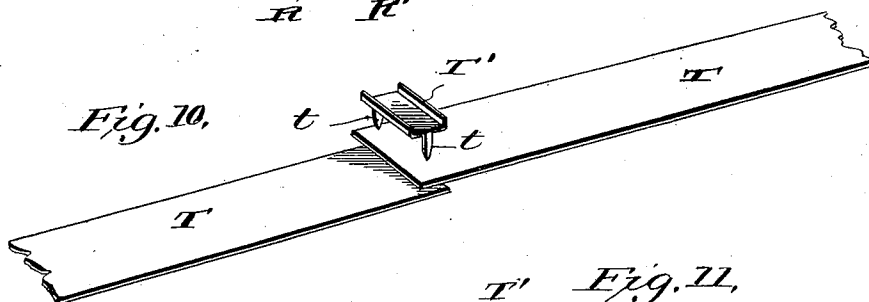
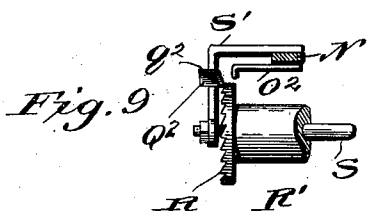


5 Sheets—Sheet 1.

No. 595,838.

Patented Dec. 21, 1897.



Witnesses:  
L. C. Hills  
E. A. Bond

*Inventor:*  
*Charles Spiro.*  
*by E. B. Stocking*  
*Appl.*

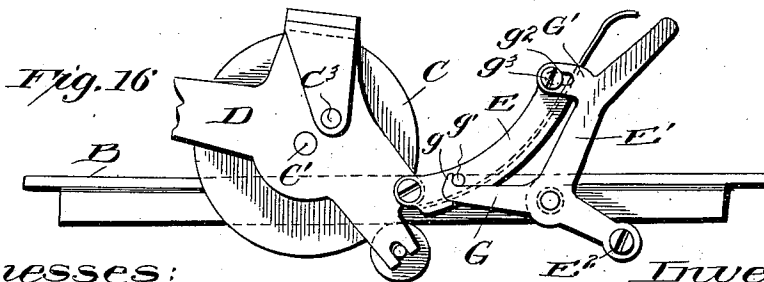
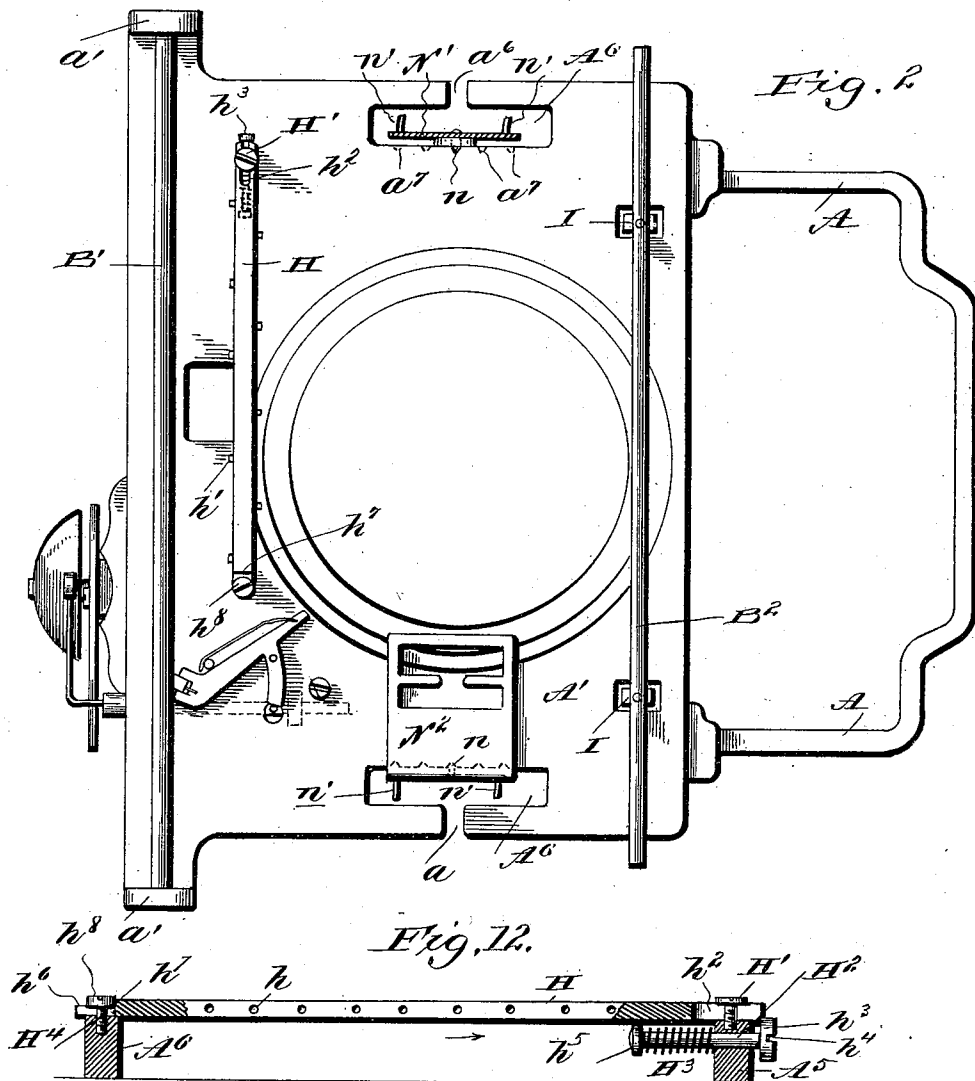
(No Model.)

5 Sheets—Sheet 2.

C. SPIRO.  
TYPE WRITING MACHINE.

No. 595,838.

Patented Dec. 21, 1897.



Witnesses:  
L. C. Hills.  
E. A. Bond.

E<sup>d</sup> Inventor:  
Charles Spiro,  
by E B Stocking  
Att'y.

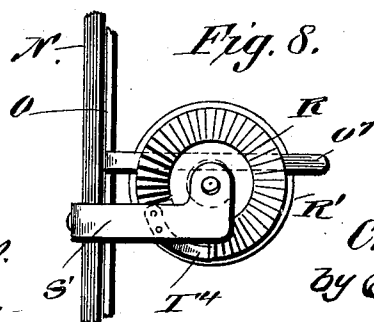
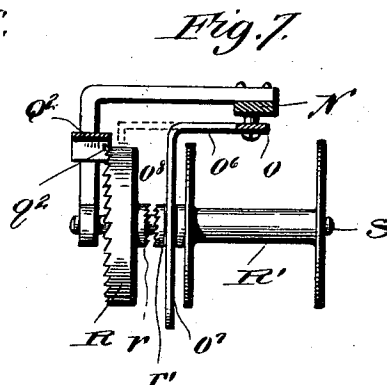
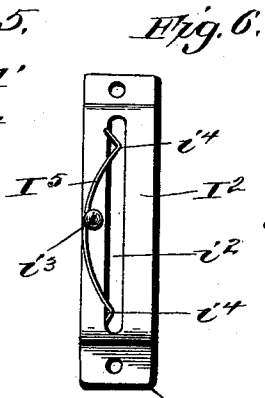
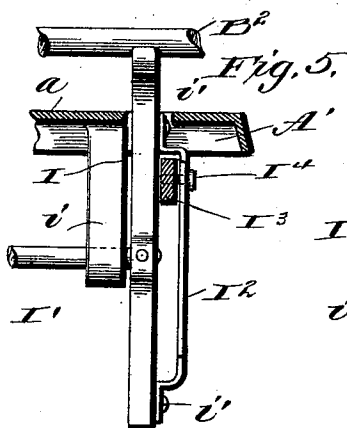
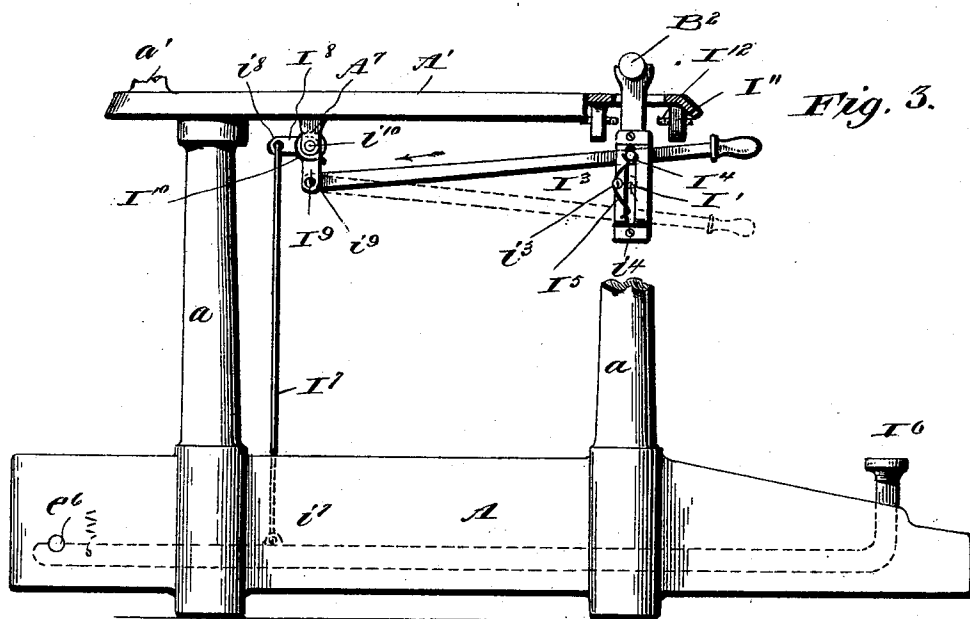
(No Model.)

5 Sheets—Sheet 3.

C. SPIRO.  
TYPE WRITING MACHINE.

No. 595,838.

Patented Dec. 21, 1897.



Witnesses:  
L. C. Hills.  
E. A. Bond

Inventor:  
Charles Spiro,  
by E. B. Stocking  
Atty.

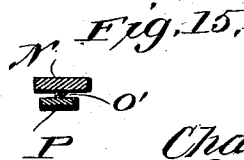
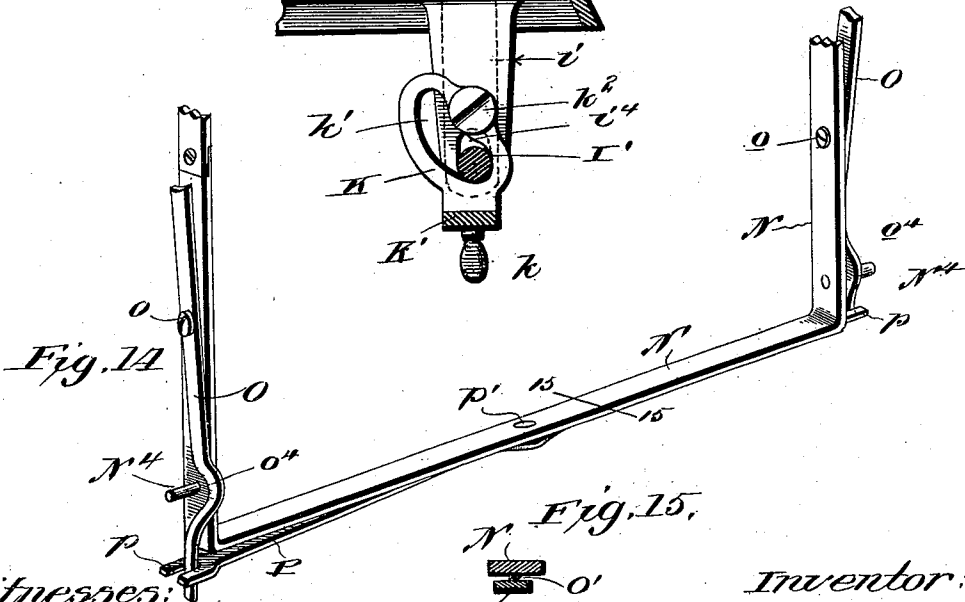
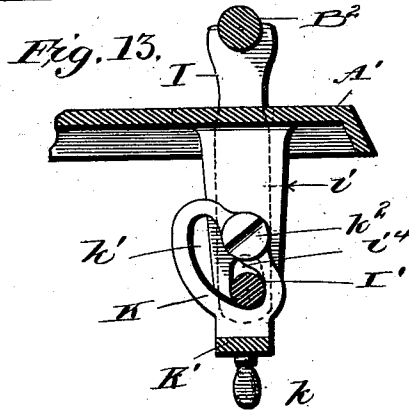
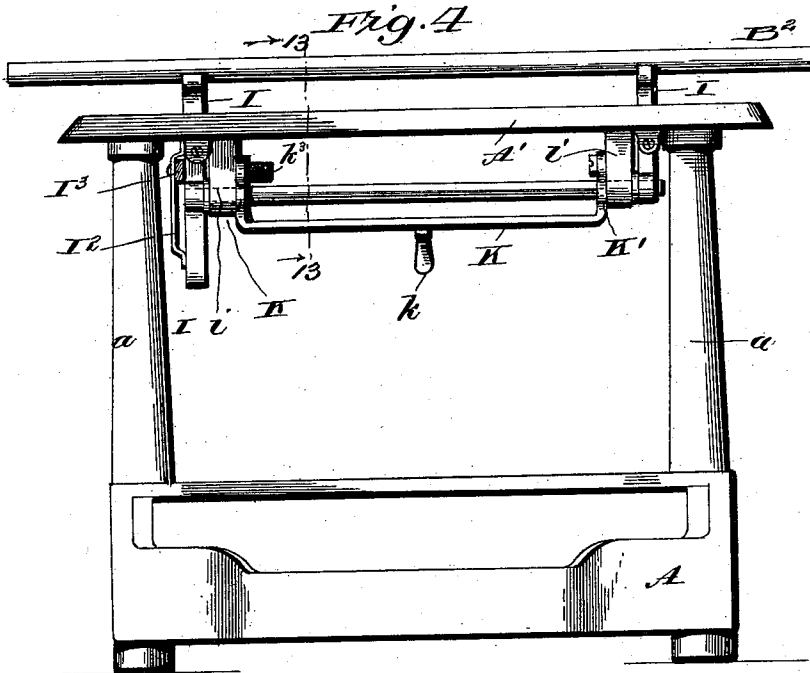
(No Model.)

5 Sheets—Sheet 4.

C. SPIRO.  
TYPE WRITING MACHINE.

No. 595,838.

Patented Dec. 21, 1897.



Witnesses:  
L. C. Hills  
C. M. Bond

Inventor:  
Charles Spiro,  
by E. B. Stocking, Atty

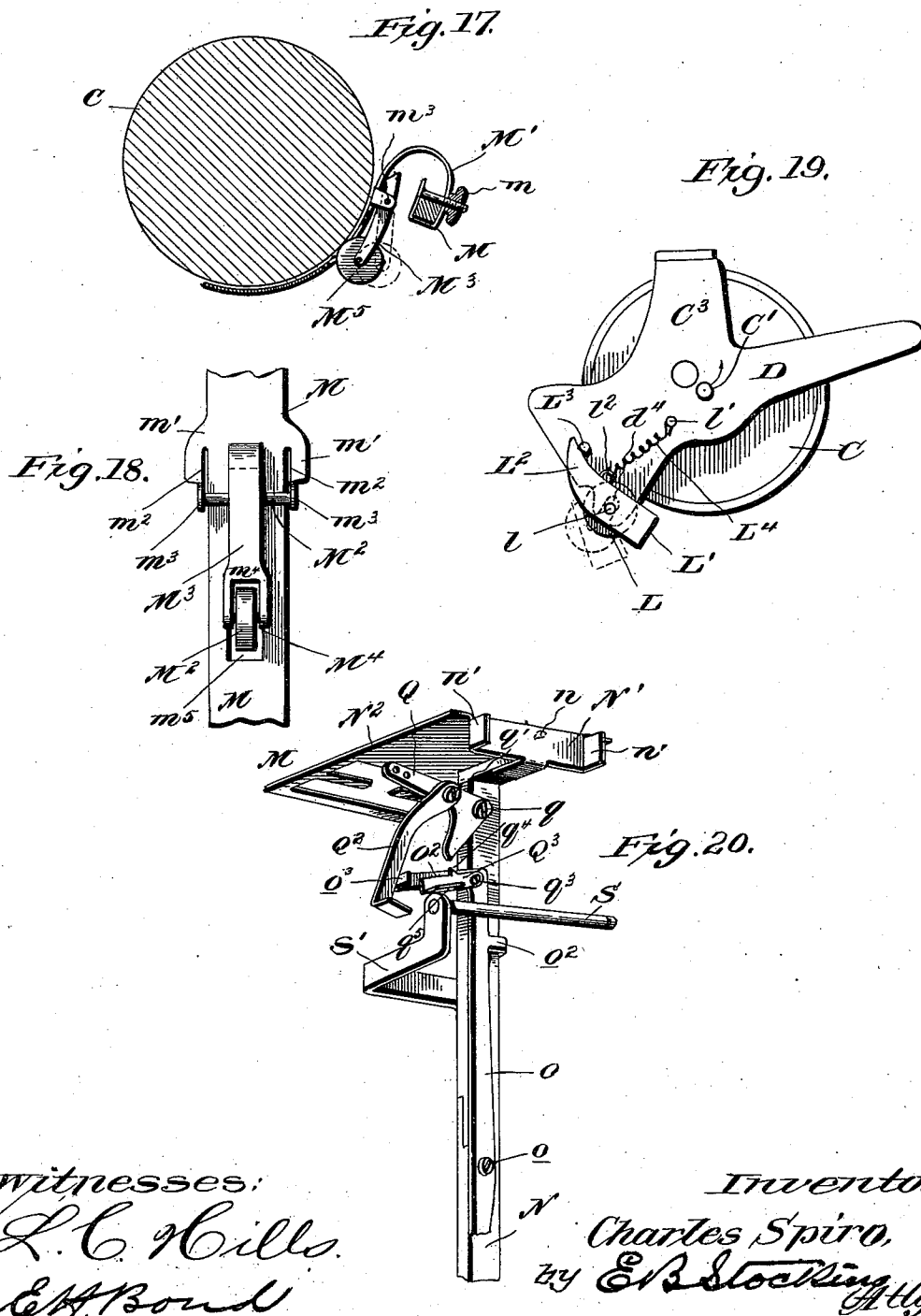
(No Model.)

5 Sheets—Sheet 5.

C. SPIRO.  
TYPE WRITING MACHINE.

No. 595,838.

Patented Dec. 21, 1897.



# UNITED STATES PATENT OFFICE.

CHARLES SPIRO, OF NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 595,838, dated December 21, 1897.

Application filed September 11, 1896. Serial No. 605,519. (No model.)

*To all whom it may concern:*

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

This invention relates to certain new and useful improvements in type-writing machines, having for its object, primarily, to materially simplify and cheapen the construction of the various parts thereof, whereby the device as a whole is rendered more perfect and complete in its details, capable of performing a greater amount of and better work with less liability to wear or to get out of order.

I provide improved mechanism for controlling the ribbon-feed.

I mount the platen in a novel manner and provide mechanism for tilting the same for the inspection of the work.

I provide simple means for shifting from upper to lower case and holding the platen in either position.

I provide for perfect work in manifolding, means being provided for adjustment of the parts in accordance with the number of sheets on the platen.

I provide a manual lateral shift for the ribbon and an automatic longitudinal feed and reverse.

I employ a movably-mounted rack-bar with means for holding it in position and permitting of its adjustment and ready removal for the substitution of another when desired.

I aim at improvements in minor details of construction.

Other objects and advantages of the invention will hereinafter appear in the following description and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation showing my improvement with portions broken away. Fig. 2 is a top plan with parts removed. Fig. 3 shows in elevation the parts broken away and

portions in section. Fig. 4 is a view in front elevation showing the mechanism for adjustment of the front rod for manifolding. Fig. 5 is an enlarged detail, partly in elevation and partly in vertical section. Fig. 6 is a view of the guide-plate and its spring, looking at right angles to Fig. 5. Fig. 7 is a detail, partly in elevation and partly in section, of the ribbon-feed spool and its mechanism. Fig. 8 is an end view of Fig. 7. Fig. 9 is a plan of the parts in section of a modified form of ribbon-spool-actuating mechanism. Fig. 10 is a perspective detail of a portion of the ribbon and its attaching-band and the stop. Fig. 11 is an edge view of the same with the stop secured in position. Fig. 12 is a detail, partly in section and partly in elevation, with portions broken away, showing the rack-bar and its holding means. Fig. 13 is an enlarged vertical section on the line 13 13 of Fig. 4. Fig. 14 is a perspective detail of the ribbon-shifting mechanism. Fig. 15 is a vertical section on the line 15 15 of Fig. 14. Fig. 16 is an end elevation showing the catch for holding the platen at rest while the paper is being inserted. Fig. 17 is a cross-section through the platen, showing in end elevation the paper-holding roller and its adjustment. Fig. 18 is an enlarged view looking at right angles to Fig. 17 and the platen omitted. Fig. 19 is an end elevation of the platen and the cradle; and Fig. 20 is an enlarged perspective view of the ribbon-feed mechanism, which is disposed at one end of the machine.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the frame of any suitable or well-known form of construction in which the operating parts are mounted, the top A' being supported upon the pillars or posts *a*, as indicated.

B is the carriage, mounted for reciprocation in usual manner, B' being the rear rod, mounted in the lugs or ears *a'* of the frame in any of the well-known ways, and B<sup>2</sup> being the front guide-rod.

C is the platen, and C' its journals.

C<sup>2</sup> are lugs on the carriage and open upon their upper face or provided with notches or rounded bearings *c*, into which are inserted the pintles C<sup>3</sup>, which are eccentrically dis-

posed with relation to the journals  $C'$ , as indicated best in Fig. 1, and project from the cradle  $D$ . The front faces of these lugs or ears  $C^2$  are rounded, as seen at  $c'$ , and upon this curved surface the journals  $C'$  of the platen work as the cradle and paper-table are tilted, as will be hereinafter more fully explained.

$E$  is the paper-table. It is pivotally connected, as at  $e$ , to the cradle, and between its ends is also pivotally connected, as at  $e'$ , to the arms  $E'$ , pivotally mounted, as at  $e^2$ , in the lugs on the under side of the carriage, said arms extending or connected with a bail  $E^2$ , which extends transversely of the machine at the rear side thereof, as shown, and with this bail is designed to be engaged the substantially vertically-disposed hooked arm or lever  $F$ , the lower end of which is pivotally connected, as at  $f$ , with the rock-shaft  $F'$ , mounted, as at  $f'$ , in the lower portion of the frame, and to the front end of which is pivotally connected, as at  $f^2$ , the link  $F^2$ , which in turn is pivotally connected, as at  $f^3$ , with a key-lever  $X$ . The construction and arrangement of these parts are such that when the lever is depressed the rock-shaft is operated and the tilting lever  $F$  elevates the bail  $E^2$ , and this bail in turn rocks the paper-table forward and downward, and that again tilts the cradle so as to bring into view the writing for easy inspection by the operator, the platen having its pivots eccentrically disposed with reference to its journals  $C'$ , which latter ride upon the curved front faces of the lugs  $C^2$  of the carriage, permitting of the requisite movement. The journals of the platen are designed to normally stop against the said lugs, and the weight of the platen itself without the assistance or aid of a spring or other extraneous means, either of weight or force, brings the cradle, the paper-table, and the bail back into their normal positions. The lugs on the carriage in which the cradle is pivoted being open, as described, the parts are maintained in their proper positions by the weight of the platen and cradle without the employment of any latches.

While ordinarily it will be unnecessary to provide any lock or other means for maintaining the platen in place, inasmuch as gravity will maintain the same in its proper position, no matter what force may be applied by the type-bars, as in manifolding, and as the paper can be inserted in the machine without the necessity for a platen-retaining lock, still in some instances it will be desirable to provide means for maintaining the platen in a position of rest while the paper is being inserted, and in Fig. 16 I have shown a construction designed for this purpose. It comprises an arm  $G$ , extending from the bail-arm  $E'$  and provided with a catch or hook  $g$  at its free end and adapted when the bail is at rest to lock the paper-table against the rocking movement, which is necessary to impel and tilt the platen-cradle  $D$  by means of the pin

$g'$ , with which it engages and which extends from the side of the paper-table, as seen in Fig. 16. It is designed to employ one of these arms and pins at each side of the machine, but one only is herein shown, as it is deemed sufficient to illustrate the construction.

The bail is provided with the forwardly-extending arms  $G'$ , having elongated slots  $g^2$ , in which work the pins or screws or analogous means  $g^3$ , projecting from the upper end of the paper-table, all as shown in Fig. 16, and which permit, first, of the unlocking of the paper-table by moving the arms  $G$ , so that their hooks are disengaged from the pins  $g'$ , and, secondly, the tilting of the cradle, as hereinbefore explained. The locking of the cradle and paper-table in position is accomplished automatically by reason of the weight of the rod or lateral portion  $E^2$  of the bail, which is engaged by the hook of the tilting lever, as shown. While in this locked position the rotation of the platen will not tilt the same because the pins  $g'$  pull against the hooked ends of the arm  $G$ , thus preventing the tilting of the table until the catches are rocked away by the tilting of the entire bail. The forwardly-extending portions of the cradle are adapted to engage the ears  $D^2$ , rising from the carriage to limit their movement, as indicated in Fig. 1.

$H$  is a supplemental rack-bar or column-bar having the opening  $h$ , in which the pins  $h'$  are designed to be removably inserted for a well-known purpose; but as there is no novelty claimed in the construction of this feature and its operation is well understood in this art it is not thought necessary to dwell thereupon nor to illustrate the coöperating features on the carriage of the machine. The novelty in this instance resides in the means for facilitating the removal and application of the bar, so that one can be removed and another of like or dissimilar character inserted in its place, according to the character of the work to be done. This bar is provided at one end with the elongated slot  $h^2$ , open at the end and through which passes the screw  $H'$ , the head of which extends beyond the walls of the slot, the screw being held in the riser or lug  $A^5$  on the top of the frame of the machine.

$H^2$  is a bolt, pin, or rod mounted for endwise movement in the riser  $A^5$  beneath and parallel with the column-bar  $H$ . It has a head  $H^3$  upon its outer end, with a slot  $h^4$  for the reception of a screw-driver, and a head or enlargement  $h^5$  at its inner end, between the outer face of which and the inner face of the riser  $A^5$  is a spring  $H^3$  encircling the rod, pin, or bolt, as shown. The head  $h^3$  of this rod, pin, or bolt is of sufficient diameter to engage the end of the column-bar, as indicated in Fig. 12. The other end of the bar  $H$  is formed with an elongated slot  $h^6$ , open at its outer end, and this end of the bar is reduced in thickness, forming the shoulder  $h^7$ , against which is designed to engage the head  $h^8$  of the screw  $h^4$ , which passes through the slot into

a riser  $H^6$  on the top of the frame of the machine, the head of the said screw overlapping the walls of the slot. In practice the column-bar may be inserted or removed as follows:

5 Supposing it to be in position, as indicated, and it is desired to remove it, all that is necessary to do is to move it in the direction of the arrow in Fig. 12 or toward the bolt  $H^2$  until the slotted end  $h^6$  is free of the head of the bolt  $H^4$ , when by elevating said end the other end may be easily slid from beneath the head of this screw, it being understood that the spring  $H^3$  is compressed by the engagement of the end of the bar with the head  $h^3$  of the bolt, pin, or projection about which it is placed, and when the bar is removed the spring returns the bolt, pin, or rod to its normal position. To insert a bar, the slotted end  $h^2$  thereof is engaged with the shank of the screw  $H^1$  beneath the head thereof, and as the end of the bar  $H$  engages the head  $h^3$  of the bolt, pin, or rod  $H^2$  and pressure is exerted in the direction of the arrow in Fig. 12 the bar and the rod, pin, or bolt are moved

10 outward, the spring being compressed until the slotted end  $h^6$  of the bar can be engaged with the shank of the screw  $H^4$ , and then when pressure is removed from the bar the spring forces the same in the opposite direction, the shoulder  $h^7$  of the bar is engaged with the head of the screw  $H^4$ , and the head of the rod, pin, or bolt  $H^2$  engaging the opposite end of the bar the latter is firmly held in position.

In order that the platen may be thrown

15 into and held in position for either upper or lower case work, I have provided the mechanism seen in Figs. 3, 5, and 6, and to which attention is now called.

The front guide-rod  $B^2$  is mounted in the arms  $I$ , as seen in said views, and these arms are pivotally mounted on the transverse shaft or rod  $I'$ , mounted in the hangers or brackets  $i$ , depending from the under side of the top  $A'$  of the machine-frame, as seen best in Fig. 5.

20 To one of these arms  $I$  is secured by screws or analogous means  $i'$  the plate or guide  $I^2$ , which is offset near its ends to throw it away from the arm to provide sufficient space for the working of the lever  $I^3$ , which is disposed between said guides and arm and is provided with a suitable handle, as seen in Fig. 3. From this lever projects the pin or screw or stud  $I^4$  which works in the slot  $i^2$  of the guide or plate  $I^2$ , and to the outer face of this guide or plate is secured substantially mid-length of the slot, as at  $i^3$ , the spring  $I^5$ , which is curved, as shown in Fig. 6, and the ends of which are bent, as at  $i^4$ , and extend into the line of the slot, and, as will be clearly understood from Fig. 3, as the lever  $I^3$  is moved up or down the pin or projection thereon will ride over the inclined portion of the spring near the end of the slot, and after it has passed the same it will be there held

25 against accidental displacement by the oppositely-inclined portion of the end of the spring, so that while the lever will be held with suf-

ficient security to prevent its accidental disengagement it can be, by sufficient pressure or force applied thereto, changed from the one position to the other. This may be done by hand as occasion may require, in which instance the rear end of the lever should be pivoted to some fixed support; but in this instance I have shown it so connected as to be operated also through the intervention of a key-lever and suitable connections. In Fig. 3,  $I^6$  is such lever, pivotally mounted, as at  $i^6$ , and to said lever, near its rear end, is pivotally connected, as at  $i^7$ , the rod or link  $I^7$ , the upper end of which is connected, as at  $i^8$ , with the arm  $I^8$  of the bell-crank lever, to the arm  $I^9$  of which is pivotally connected, as at  $i^9$ , the rear end of the lever  $I^3$ . The bell-crank lever is pivotally mounted, as at  $I^{10}$ , on the lug or ear  $A^7$ , projecting from the under face of the top  $A'$  of the frame of the machine, as seen in Fig. 3, and around this pivot is a spring  $I^{10}$ , the tendency of which is at all times to draw in the same direction—that is, that indicated by the arrow in Fig. 3. It will be readily seen that the front rod  $B^2$  can thus be shifted back and forth and changed from upper to lower case, or vice versa, by pressure upon the key-lever  $I^6$ , which, through the connecting-link and bell-crank lever, actuates the lever  $I^3$ , which is held in either of these positions by the spring  $I^5$ , or this adjustment of the front rod can be brought about by the manipulation of the lever  $I^3$  by hand, as may be desired.  $I^{11}$  are lugs depending from the under side of the top of the frame of the machine, as seen in Fig. 3, and mounted in these lugs are the screws  $I^{12}$ , one upon each side of the upright  $I$ , by which the front rod is carried, and these screws are mounted for adjustment in the said ears or lugs, so that the limit of movement of the arm  $I$  can be regulated, so that the shift-rod will be thrown the required distance to bring the platen into proper position.

In Fig. 1 I have shown another form of mechanism for shifting the platen from upper to lower case, or vice versa. In this case the uprights or arms  $I$  are pivoted, as at  $I'$ , and are shown in Fig. 1 as provided with a lateral arm  $J$ , having an opening  $j$  at its rear end to receive a link or other ligament by which it may be shifted to the shift-key  $I^6$ , although this ligament is in this view omitted for the sake of clearness.  $J'$  is a lever pivotally mounted, as at  $j'$ , on the lateral arm  $J$  in line with its pivot  $I'$ , and this lever has the forwardly-extending portion  $J^2$ , the upper face of which is cam-shaped, as shown at  $j^2$ , and this operates against and in conjunction with the adjustable pin  $J^3$ , extended downward through the top  $A'$  of the frame of the machine.  $J^4$  is a stop-pin on the upright  $I$ . It will thus be readily seen that pressure upon the lever  $J'$  in the direction of the arrow indicated in Fig. 1 will cause the cam portion to move in the direction of the arrow thereon, which will force the arm  $J$  downward, as indicated by the



arrow, and the upright I to the rear, as indicated by the arrow, and thus throw the platen rearward in position for use in connection with upper-case characters. Movement in the opposite direction brings the carriage and platen back to their normal position. Manipulation of the shift-key will bring about the same movements. The pin J<sup>4</sup> serves to limit the movement of the portion J<sup>2</sup> of the lever and stop it in the proper position.

In order to provide for the adjustment of the platen vertically in accordance with the number of sheets of paper on the platen, as in manifolding, I employ the mechanism seen in Figs. 4 and 13, in which K is a rod or bar arranged parallel with the front guide-rod and with the pivot I' thereof and provided with a suitable handle *k*, by which it may be manipulated. At its ends this rod or bar carries the upwardly-extending portions K', which are formed with the cam-slots *k'*, through which the pivot-bar I' of the uprights I passes, the depending lugs *i* being provided with the vertically-elongated slots *i'*, as seen best in Fig. 13, and the vertical portions K' being pivotally mounted, as at *k*<sup>2</sup>, by screws or other means held in the depending lugs or brackets *i*, and one of said pivots may be in the form of a thumb-screw, with its outer end milled or roughened, as seen at *k*<sup>3</sup> in Fig. 4. It will readily be seen how by manipulation of the handle *k* on the cross bar or rod K the supports I and the front guide-rod B<sup>2</sup> will be moved vertically in accordance with the thicknesses of paper upon the platen, the uprights and guide-rod being held in any adjusted position by reason of the cam-face of the slots *k'* in the vertical portions K' of the bar K.

L is the roll parallel with the platen and between which roll and platen the paper is designed to pass.

L' is the bail in which the pintles *l* of the roller are mounted, the end plates of the cradle having the slots *d'*, in which these pintles work, as indicated in Fig. 19, and the end portions L<sup>2</sup> of this bail have their inner faces inclined or cam-shaped, as shown, and bear against the pins L<sup>3</sup>, held in the end faces of the cradle, as indicated, and which form the fulcrum for the bail.

L<sup>4</sup> are springs, one at each end of the platen, attached at one end to the end pieces of the cradle, as seen at *l'*, and at the other end, as at *l*<sup>2</sup>, to a hook or any convenient means on the end pieces of the bail, these springs serving to hold the roller against the platen with sufficient force to hold the paper and yet permitting of the movement of the roller away from the platen, as indicated in dotted lines in Fig. 19, as becomes necessary by the thicknesses of the paper employed.

M is a bar or rod extending from one side to the other of the platen-frame and connected to the under face thereof in any suitable manner. On this rod are the guide-springs M', arranged one at each end, being shown in

Fig. 17 as held in position by the bolts and thumb-nuts *m* passing through parallel portions of the springs and detachably holding them to the rod. These plates are bent to conform to the curvature of the platen, as seen in Fig. 17, and at a point substantially in line and just below the horizontal axial line of the platen. Each spring plate or guide is formed with the spring portions *m'* separated therefrom by the slits *m*<sup>2</sup>, as seen best in Fig. 18, and thence bent at right angles to form the ears or lugs *m*<sup>3</sup>, in which is held the pin M<sup>2</sup>, parallel with the axis of the platen, and mounted thereon is the arm M<sup>3</sup>, the lower end of which is bifurcated, as at *m*<sup>4</sup>, and in the fork thereof is the shaft M<sup>4</sup>, carrying a roller M<sup>5</sup>, which works through a slot or opening *m*<sup>5</sup> in the spring-guide or plate M, so as to bear upon the paper. The spring portions permit of the necessary yielding movements of the rollers and the arms by which they are carried, and the upper end of the arm being beveled or inclined the roller is automatically held in any adjusted position.

The top A' of the frame is provided with the slots A<sup>6</sup>, extending at right angles to the guide-rod and having the slots *a*<sup>6</sup> open at the ends of the frame and communicating with said slots A<sup>6</sup>, as indicated in Fig. 2. The inner walls of the slots A<sup>6</sup> are formed with notches *a*<sup>7</sup>, as indicated best in Fig. 2.

N is a bail. At the upper ends of this bail are carried the ribbon-guides N', provided upon their rear faces with the tapered rods or projections *n*, which are adapted to ride in the notches *a*<sup>7</sup> in the top of the frame, these guides being provided with the right-angled portions *n'*, between which the ribbon is held, and formed also with the horizontal portions N<sup>2</sup> (seen in Figs. 2 and 20) and provided with slots of usual form which receive the ribbon and serve to keep it flat and prevent wrinkling and doubling thereof, this being a feature common in this class of devices.

O are levers pivotally mounted, as at *o*, on the sides of the bail, as seen most clearly in Fig. 14, and these levers have their lower free ends engaged in the forks *p* of the lever P, which lever is made springy and is disposed upon the under side of the horizontal portion of the bail underneath the machine. This lever is made springy, so that it may be maintained in two different positions on riding over the coned portions O' on the adjacent faces, the said lever P being pivotally mounted at its center, as at *p'*, on the horizontal portion of the bail. The lower ends of the levers O are straddled by the bifurcations of the ends of the lever P, as shown, so that when one lever is moved in one direction the lever O on the opposite side of the bail will be simultaneously moved in the opposite direction. These levers O near their upper ends have the lugs *o*<sup>2</sup>, which engage the edge of the vertical portion of the bail, as seen in Fig. 20, to limit the movement of the lever on the

bail. The extreme upper end of each lever is bent to form the horizontal arm  $O^2$ , the free end of which is bent at right angles to its length to form the lug or stop  $o^3$ . Pivotal-  
 5 mounted on the outer faces of the vertical portions of the bail, near the upper ends thereof, as at  $q$ , are the levers  $Q$ , being so pivoted as to normally fall by gravity, and the rear ends thereof are connected by rod,  
 10 link, or ligament  $Q'$  with the bail  $Q^{2x}$ , which is the universal bail of the machine. Pivotal-ly mounted, as at  $q'$ , on these levers  $Q$  are the rocking levers  $Q^2$ , the free ends of which carry pawls  $q^2$ , adapted to ride on the crown-  
 15 ratchets  $R$ , made a part of the end of the ribbon-spools  $R'$ . The connections between the bail and the levers above described are made as near the center of the ribbon-spool bail as possible, so that the shifting of the ribbon-  
 20 spool bail forward or backward will not affect the throw of the rocking lever. The levers  $O$  near their lower ends are formed with the offsets or curved bends  $o^4$ , as indicated best in Figs. 1 and 13, so as to throw them out of  
 25 the way of the pivots  $N^4$  of the bail  $N$ .

$Q^3$  are levers pivoted at  $q^3$  on the upper ends of the side levers  $O$  and having a tooth or extension  $q^4$  and a right-angled or horizontal portion  $q^5$ , as seen in Figs. 1 and 20. It  
 30 will be understood that there is one of these levers  $Q^3$  at each side of the machine, and each is so disposed that its right-angled portion nearly touches the ribbon, so that when the ob-  
 35 struction or clasp  $T$  at each end of the ribbon or at a point joining the ends of two different ribbons comes in contact with the said right-angled portion or bend it lifts the whole lever up in the path of the lever  $Q$ , so that upon  
 40 the next depression of a key-lever a key-lever  $Q$  will strike this right-angled portion, and the lever  $Q^3$  being pivoted on the side lever  $O$  of the ribbon-spool bail the automatic reverse of the ribbon-feed is accomplished.

The ribbon-spools are detachably mounted  
 45 upon ears or rods  $S$ , supported in the arm  $S'$ , extending from the vertical portion of the bail, as indicated, and the spool can be readily detached by merely pulling it off its pin or  
 50 shaft after the ribbon-spool bail has been rocked as far as possible. The ribbon-spool may sometimes be formed with an inner flange  $R^2$ , as indicated in Fig. 1, adapting it to receive two different kinds or colors of ribbon,  
 55 so as to enable the operator to shift from one color or kind of ribbon to another almost instantly. The ribbon-spool may be provided with a handle  $R^3$  at one end, as indicated also in Fig. 1, by which it may be revolved by  
 60 hand when desired.

$T$  is the ribbon. It is provided near each end with a projection, and in Figs. 10 and 11 this projection is shown at  $T'$  in the form of a fastener having prongs  $t$ , passed through the ribbon and into the cloth strip by which  
 65 the end thereof is connected with the ribbon-spool and there fastened. Fig. 10 may represent the end of the ribbon thus connected

to the cloth, which is fastened to the spool, or it may represent the connection between two different kinds of ribbon—for instance, 70 one a record and the other a copying—the function of the class or projection being the same in both instances—namely, to secure the end of the ribbon to the adjacent part and serve also as a projection for operating 75 the lever  $O$  and bringing about an automatic shift in the ribbon-feed.

At each depression of a key-lever the bail  $Q^2$  is depressed, as shown, and this through its connection with the lever  $Q$  causes the 80 pawl  $q^2$  to engage the crown-ratchet of the ribbon-spool and move it one tooth at each depression of a key-lever or rather at each return movement of a return-lever, the rotation of the spool being moved once at each 85 manipulation of a key-lever. As the projection on the ribbon approaches the end of the pivoted lever  $Q^3$  it is lifted up in the way of the lever  $Q$ , so that the latter upon one side of the machine is thrown out of its operative 90 relation with the crown-ratchet on the ribbon-spool and that upon the other side is thrown into operative engagement with the crown-ratchet on the ribbon-spool upon its side, and automatic reverse of the ribbon-feed is thus 95 brought about.

In Figs. 7 and 8 I have shown the crown-ratchet  $R$  as being fast upon the ribbon-spool shaft  $S$  and provided with the hub  $r$ , carrying one portion of a clutch, while the other 100 portion  $r'$  is carried by the hub of the ribbon-spool, and on the lever  $O$  is an arm  $O^6$ , bent at right angles to the length of the lever and again at right angles, forming the portion  $O^7$ , which engages in an annular groove  $o^8$  in the 105 hub of the spool, so that the vibratory movement of the lever  $P$  and the levers  $O$  will throw the clutch of the ribbon-spool upon one side of the machine into engagement and the other simultaneously out of engagement or 110 operative relation, bringing about the same result. In this instance a spring-pawl  $T^4$  is mounted upon the arm  $S'$ , as indicated in Fig. 8, to engage the crown-ratchet and prevent retrograde movement thereof and of the spool. 115

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages. Having thus described my invention, what I claim as new, and desire to secure by Let- 120 ters Patent, is—

1. The combination with the platen and the front guide-rod and a vertically-movable support therefor, of mechanism engaging the support of said guide-rod for moving the lat- 125 ter vertically; substantially as and for the purpose specified.

2. The combination with the platen and the front guide-rod having its pivotal support mounted for vertical movement, of means for 130 engaging said support to move it vertically; substantially as described.

3. The combination with the platen and the front guide-rod, of a pivoted bail having

cam portions for elevating said rod; substantially as described.

4. The combination with the platen and the front guide-rod, of a pivoted bail having cam-slots in which the pivot of the front guide-rod works, and supporting-lugs for the pivots of the bail having vertical slots for the passage of the pivot of the guide-rod; substantially as described.

5. The combination with the top of the frame having depending lugs with vertical slots, of the front guide-rod and its supports, a rod connecting said supports and passed through the slots of the lugs, and a bail having vertical portions pivoted on said lugs and having cam-slots engaging the pivot-rod of said supports; substantially as described.

6. The combination with the platen and its front guide-rod and a vertically-movable support therefor, of means engaging the support of said guide-rod for elevating said rod and automatically holding it in its adjusted position to compensate for varying thicknesses of paper upon the platen; substantially as described.

7. The combination with a carriage and platen; of a pivoted cradle having bearings for concentric pintles and eccentric bearings for the platen, and a paper-table pivotally connected to the cradle, substantially as specified.

8. The combination of a pivotally-mounted paper-table and a pivotally-mounted cradle pivoted thereto, of an eccentrically-mounted platen having its eccentric pintles permanently supported in said cradle; substantially as described.

9. The combination of a pivoted paper-table, a pivotally-mounted cradle pivoted to said table, a platen mounted to revolve therein, and pintles disposed eccentrically with relation to the axis of said platen and supported in lugs on the carriage; substantially as described.

10. The combination of a paper-table, a pivotally-mounted cradle and a platen having concentric journals and eccentric pintles, and means acting upon the paper-table to tilt the same; substantially as described.

11. The combination with the carriage, of a cradle mounted on pintles eccentric with the axis of the platen, and a platen mounted in said cradle and a paper-table pivotally connected with the cradle; substantially as described.

12. The combination of a carriage, the pivoted paper-table and the cradle jointed thereto and mounted on pintles eccentric with the axis of the platen, and stops having rounded bearings and projecting upward from the carriage for engaging the ends of the cradle; substantially as described.

13. The combination with the paper-table and the cradle pivotally connected to tilt in opposite directions, and a platen concentrically mounted and having eccentric pintles, of the bail mounted in the carriage and pivot-

ally connected with the table, and a key-lever and connections for actuating said bail; substantially as described.

14. The combination with the paper-table and the cradle pivotally connected to tilt in opposite directions, of the bail mounted in the carriage and pivotally connected with the table, a key-lever and connections for actuating said bail, and stops having rounded bearings and projecting upward from the carriage for limiting the downward movement of the cradle; substantially as described.

15. The combination with the pivoted paper-table, a cradle pivotally connected therewith, of a bail pivotally connected with the paper-table, a rock-shaft, and connections between the same and said bail and with a key-lever; substantially as described.

16. The combination with the paper-table and the cradle pivotally connected to tilt simultaneously in opposite directions, of a bail pivotally supported in the carriage and pivotally connected with the paper-table, a key-lever, a rock-shaft, a link connecting the rock-shaft with the key-lever, and a hooked rod connected with the rock-shaft and engaging said bail; substantially as described.

17. The combination with the front guide-rod and its pivoted vertically-movable supports, of a pivoted lever and means connected therewith for moving said supports on their pivot; substantially as specified.

18. The combination with the front guide-rod and its pivoted vertically-movable supports, of a pivoted lever, means connected therewith for moving said supports on their pivot, and devices for holding the lever in its adjusted position; substantially as described.

19. The combination with the front guide-rod and its pivoted vertically-movable supports, of a pivoted lever, means connected therewith for moving said supports on their pivot, devices for holding the lever in its adjusted position, and connections between said lever and a key-lever; substantially as described.

20. The combination with the front guide-rod and pivoted supports, of a plate mounted on one of said supports having a vertical slot, a pivoted lever provided with a pin working in said slot, and a spring secured to said plate and having its ends overlapping the slot at its ends to be engaged by said pin; substantially as described.

21. The combination with the front guide-rod and its pivoted supports, of a pivoted lever, means for holding said pivoted supports in any position, and an adjusting-screw for limiting the movement thereof; substantially as described.

22. The combination with the front guide-rod and its pivoted supports, of a plate mounted on one of the supports and having a vertical slot, a lever pivotally mounted and having a lateral pin working in said slot, said lever being disposed between the support and the plate, and a spring secured centrally to

said plate and having its ends extended into the slot and bent to be engaged by said lateral pin; substantially as described.

23. The combination with the front guide-rod and its pivoted supports, of a plate mounted on one of the supports and having a vertical slot, a lever pivotally mounted and having a lateral pin working in said slot, said lever being disposed between the support and the plate, a spring secured centrally to said plate and having its ends extended into the slot and bent to be engaged by said lateral pin, a bell-crank lever upon which said lever is pivoted, and a connection between the same and a key-lever substantially as described.

24. The combination with the front guide-rod and its pivoted supports, of a plate mounted on one of the supports and having a vertical slot, a lever pivotally mounted and having a lateral pin working in said slot, said lever being disposed between the support and the plate, a spring secured centrally to said plate and having its ends extended into the slot and bent to be engaged by said lateral pin, a bell-crank lever upon which said lever is pivoted, a connection between the same and a key-lever, and a spring around the pivot of the bell-crank lever; substantially as described.

25. The combination with the platen and the rod parallel therewith, of spring-guides secured to the said rod and having spring portions at the sides separated from the body portion by longitudinal slits and supporting the pivot of a roller; substantially as described.

26. The combination with the platen and the rod parallel therewith, of the spring-guides secured to the rod and having spring-lugs separated from the body portion by longitudinal slits, levers pivoted in said lugs, and rollers carried by the lower ends of the levers to press the paper against the platen; substantially as described.

27. The combination with the platen and the rod parallel therewith, of the spring-guides secured to the ends of the rod and having slots, and spring-lugs at the sides separated from the body portion by longitudinal slits and bent upon themselves, levers pivotally mounted in said spring-lugs, and rollers mounted on the lower end of the levers, and working through said slots to press the paper against the platen; substantially as described.

28. The combination with the platen and the cradle, of the bail having right-angled portions engaging lateral pins on the end pieces of the cradle, and a roller mounted in said end pieces parallel with the platen; substantially as described.

29. The combination with the platen and the cradle, of the bail having right-angled portions engaging lateral pins on the end pieces of the cradle, and a roller mounted in said end pieces parallel with the platen, and

springs connecting the end pieces of the bail with the end pieces of the cradle; substantially as described.

30. The combination with the platen and the cradle having its end pieces formed with slots, of a bail having right-angled end portions fulcrumed on the pin projecting from the end pieces of the cradle, and a roller mounted in the end pieces of the bail; substantially as described.

31. The combination with the platen and the cradle having its end pieces formed with slots, of a bail having right-angled end portions fulcrumed on the pin projecting from the end pieces of the cradle, a roller mounted in the end pieces of the bail, and a spring secured at one end to the end pieces of the cradle and at the other end to the end pieces of the bail between the fulcrum and the pintles of the roller; substantially as described.

32. The combination with the paper-table and the cradle pivotally connected therewith to tilt simultaneously in opposite directions, of the bail having a catch to engage a pin on the paper-table; substantially as described.

33. The combination with the paper-table and the cradle pivotally connected therewith to tilt simultaneously in opposite directions, of the bail having a catch to engage a pin on the paper-table, and having a forwardly-extending arm having loose connection with the paper-table; substantially as described.

34. The combination with the paper-table and the cradle pivotally connected together to tilt simultaneously in opposite directions, of the bail pivotally mounted on the carriage and having a hooked arm extended to engage a pin on the paper-table, a forwardly-extending arm above its pivot having an elongated slot, and a projection on the paper-table working in said slot; substantially as described.

35. In a type-writing machine, a column-bar having open-ended slots at each end combined with means for forcing the said bar endwise; substantially as described.

36. In a type-writing machine, a column-bar having open-ended slots at each end, one of which is cut away to form a shoulder combined with means for forcing said bar endwise; substantially as described.

37. The combination with the top of the frame and the lugs rising therefrom, of the column-bar having open-ended slots at each end, screws passed through said slots into the lugs, and a spring-actuated part passed through one of the lugs parallel with the bar; substantially as described.

38. The combination with the top of the frame and the lugs rising therefrom, of the column-bar having open-ended slots at each end, screws passed through said slots into the lugs, and a spring-actuated part passed through one of the lugs parallel with the bar and having a head to engage one end of the bar; substantially as described.

39. The combination with the top of the frame and the lugs rising therefrom, of the

- column-bar having open-ended slots at each end, screws passed through said slots into the lugs, a spring-actuated part passed through one of the lugs parallel with the bar and having a head to engage one end of the bar, and a spring on the opposite side of the lug; substantially as described.
40. The combination with the top of the frame and the lugs rising therefrom, of a column-bar having open-ended slots at each end and at one end a reduced portion in shoulder, headed screws passed through said slots into the lugs, and a headed rod mounted to slide through one of the lugs parallel with the column-bar; substantially as described.
41. The combination with the top of the frame and the lugs rising therefrom, of a column-bar having open-ended slots at each end and at one end a reduced portion in shoulder, headed screws passed through said slots into the lugs, a headed rod mounted to slide through one of the lugs parallel with the column-bar, and a spring around said rod between its inner end and the inner face of the lug; substantially as described.
42. The combination with an automatic ribbon-feed-reverse mechanism, of a ribbon, and a ribbon-fastener comprising a plate adapted to project from the face of the ribbon and provided with prongs for the connection of the plate with the ribbon, substantially as specified.
43. The combination with ribbons of different characters and with ribbon-feed-reverse mechanism, of a plate provided with attaching-prongs whereby it serves a double function of connecting said ribbons and operating the feed-reverse mechanism, substantially as specified.
44. The combination with the frame having ribbon-receiving slots having notches, of a vibratory ribbon-spool bail having projections to engage said notches; substantially as described.
45. The combination with the frame having ribbon-receiving slots with notches, of the ribbon-spool bail and the ribbon-guides carried thereby and provided with projections to engage said notches; substantially as described.
46. The combination with the frame having ribbon-receiving slots and notches, of a vibratory ribbon-spool bail having projections to engage said notches, and vertical and horizontal ribbon-guides; substantially as described.
47. The combination with the frame having ribbon-receiving slots and the vibratory ribbon-spool bail, of means for holding the latter in its adjusted positions, and ribbon-guides carried by the upper ends of the vertical portions of the bail; substantially as described.
48. The combination with the vibratory ribbon-spool bail, of levers pivotally mounted thereon, connections whereby said levers are moved simultaneously in opposite directions, pawls arranged in the path of the upper ends of said levers, and rocking levers to which said pawls are connected and ribbon-spools operated by said pawls; substantially as described.
49. The combination with the ribbon-spool bail, of the levers mounted upon the vertical portions thereof, and having offsets opposite the pivots of said bail; substantially as described.
50. The combination with the ribbon-spool bail, of the levers mounted upon the vertical portions thereof, and having offsets opposite the pivots of said bail, and their upper ends provided with stops to engage the vertical portions of the bail; substantially as described.
51. The combination with the ribbon-spool bail, of the levers mounted upon the vertical portions thereof, and having offsets opposite the pivots of said bail, and their upper ends provided with lateral portions; substantially as described.
52. The combination with the ribbon-spool bail and the lever pivotally mounted beneath the horizontal portion thereof, of the levers mounted on the vertical portions of the bail and adapted to be actuated by the ends of the first-mentioned lever; substantially as described.
53. The combination with the ribbon-spool bail and the ribbon-spool and its ratchet, of a lever pivotally mounted on the bail, and a lever mounted on said lever and at its free end carrying a pawl adapted to engage said ratchet; substantially as described.
54. The combination with the ribbon-spool bail and the ribbon-spool and its ratchet, of a lever pivotally mounted on the bail, a lever mounted on said lever and at its free end carrying a pawl adapted to engage said ratchet, and a lever pivoted on the vertical portion of the bail and extending in the direction of the length thereof and having a lateral portion to engage the lever carrying the pawl to move it away from its ratchet; substantially as described.
55. The combination with the ribbon-spool bail and the ribbon-spools and their ratchets, of the levers pivotally mounted on the vertical portions of said bail, means for moving them simultaneously in opposite directions, and interposed devices between their upper ends and the ratchets of the ribbon-spools for automatically reversing the feed of the ribbon; substantially as described.
56. The combination with the ribbon-spool bail and the ribbon-spools and their ratchets, of the levers pivotally mounted on the vertical portions of said bail, means for moving them simultaneously in opposite directions, interposed devices between their upper ends and the ratchets of the ribbon-spools for automatically reversing the feed of the ribbon, and a clutch between the spool and its ratchet; substantially as described.
57. The combination with the ribbon-spool bail and the ribbon-spools and their ratchets, of the levers pivotally mounted on the vertical portions of said bail, means for moving

them simultaneously in opposite directions, interposed devices between their upper ends and the ratchets of the ribbon-spools for automatically reversing the feed of the ribbon, and a clutch between the spool and its ratchet, and an arm connected with the vertical lever of the bail and engaging the movable portion of said clutch; substantially as described.

58. The combination with the ribbon-spool bail the ribbon-spools and their ratchets and the levers mounted on the side portions thereof and having lateral portions at their upper ends, of means for moving said levers simultaneously in opposite directions, and levers pivotally mounted at the upper ends of the vertical portions of the bail and having pawls pivotally supported therefrom; substantially as described.

59. The combination with the ribbon-spools, their ratchets, the ribbon-spool bail and the levers mounted on the side portions thereof and having lateral portions at their upper ends, of means for moving said levers simultaneously in opposite directions, levers pivotally mounted at the upper ends of the vertical portions of the bail and having pawls pivotally supported therefrom, and the universal bail connected with the upper levers; substantially as described.

60. The combination with the ribbon-spools and their ratchets, the ribbon-spool bail and the levers mounted on the side portions thereof and having lateral portions at their upper ends, of means for moving said levers simultaneously in opposite directions, levers pivotally mounted at the upper ends of the vertical portions of the bail and having pawls pivotally supported therefrom, the universal bail connected with the upper levers, and

portions on the upper ends of the vertical levers to engage the vertical portion of the bail; substantially as described.

61. The combination with the ribbon-spools and the ribbon having an obstruction near each end, of the vibratory ribbon-spool bail having right-angled portions to seize and guide the ribbon at the end of the machine, and mechanism supported therefrom for engagement with the obstruction on the ribbon to reverse the feed thereof; substantially as described.

62. The combination with the ribbon-spool bail and the ribbon-spools and their ratchets, of a ribbon having an obstruction near each end lying flat against the outer face thereof, pivoted pawls engaging said ratchets, and mechanism mounted for movement by contact therewith of said obstruction to throw one of the pawls out of engagement and the other into engagement with the spool-ratchets; substantially as described.

63. The combination with the ribbon-spool bail and the ribbon-spools and their ratchets, of a ribbon having an obstruction near each end lying flat against the outer face thereof, pivoted pawls engaging said ratchets, mechanism mounted for movement by contact therewith of said obstruction to throw one of the pawls out of engagement and the other into engagement with the spool-ratchets, and connections with the universal bail for giving the ratchets a step-by-step movement; substantially as described.

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

CHARLES SPIRO.

Witnesses:

MICHAEL P. CORRIGAN,  
M. G. FINNERON.