A. G. F. KUROWSKI.

TYPE WRITING MACHINE.

APPLICATION FILED FEB. 5, 1913.

1,198,638.

Patented Sept. 19, 1916.

3 SHEETS—SHEET 1.

FIG. 11.

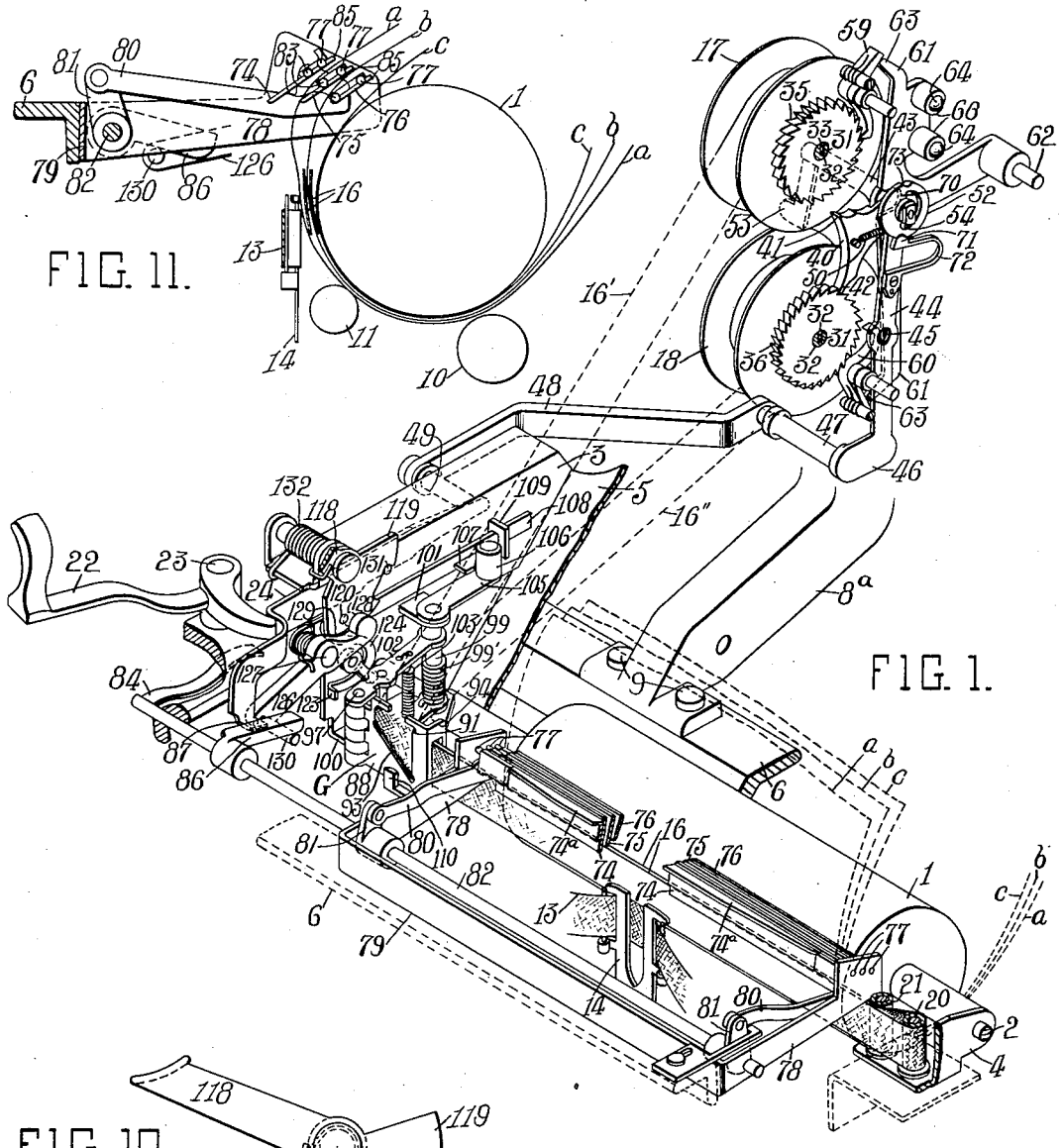
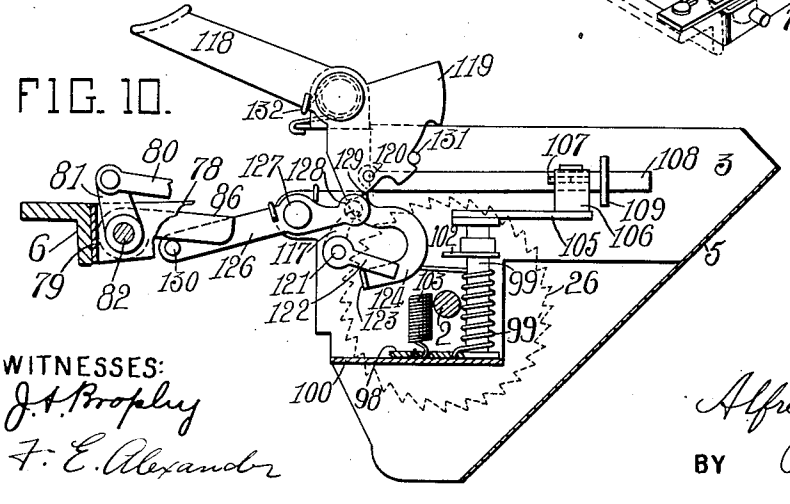


FIG. 1.

FIG. 10.



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3 SHEETS—SHEET 2.

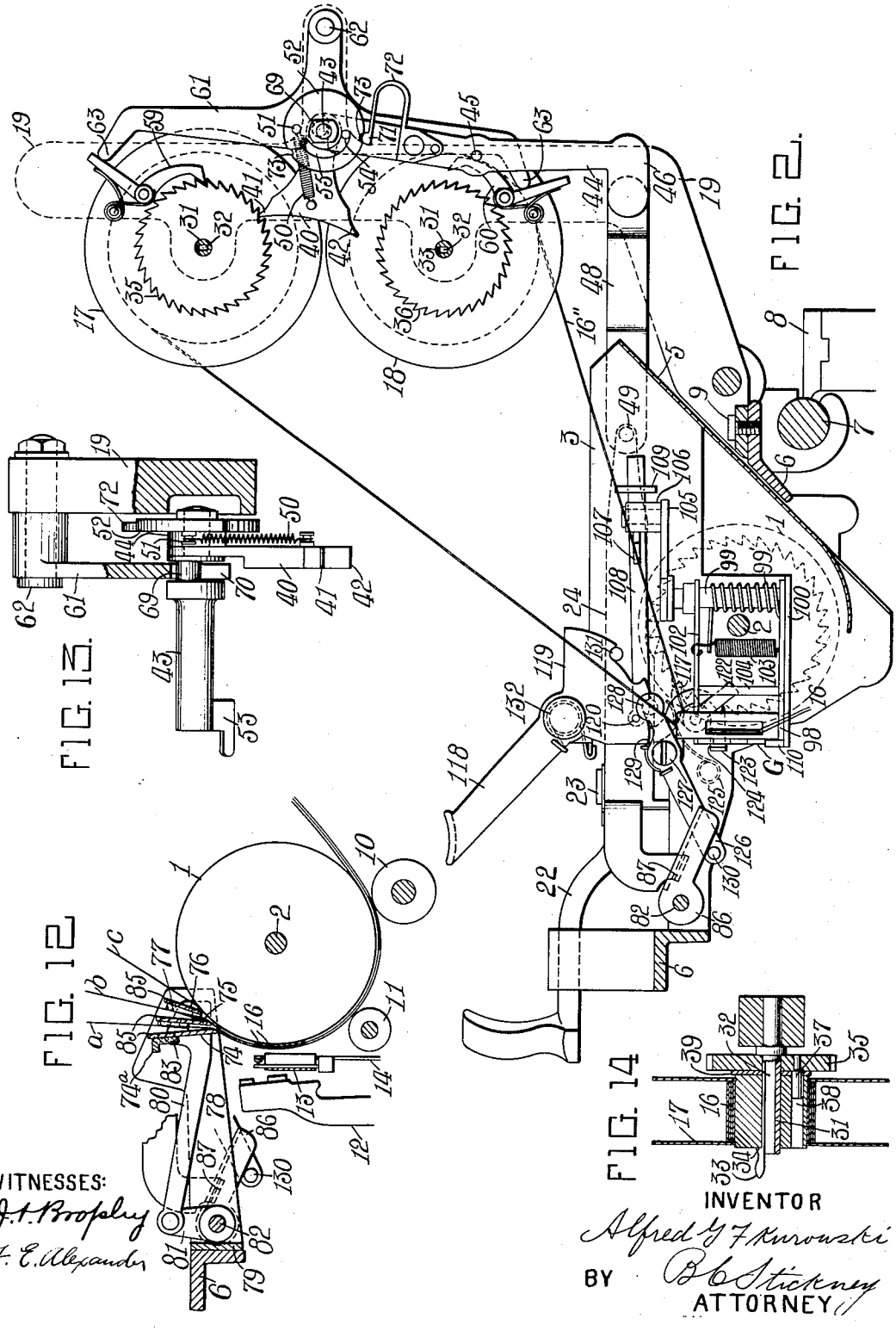


FIG. 2.

FIG. 13.

FIG. 12.

FIG. 14.

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3 SHEETS—SHEET 3.

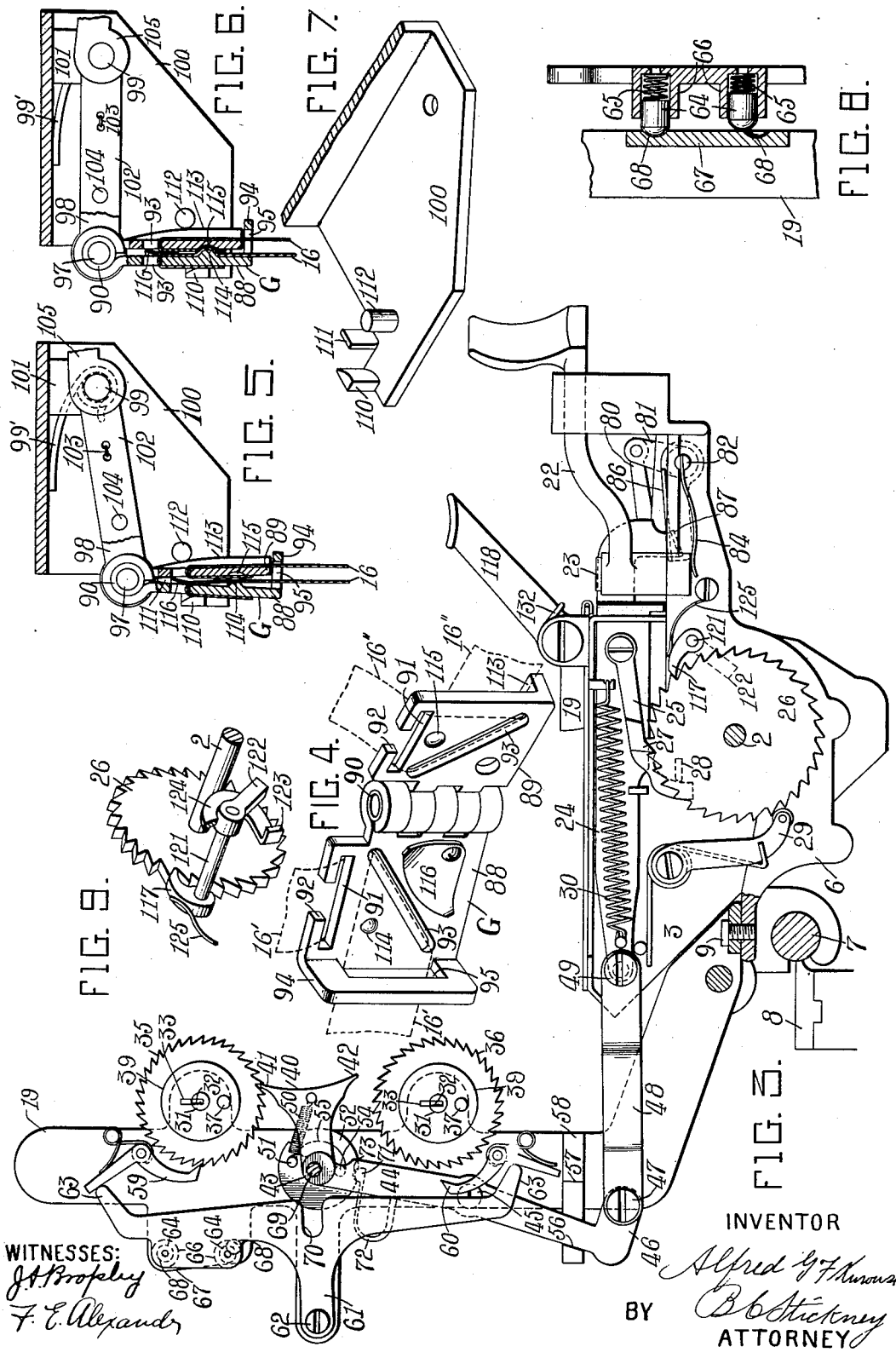


FIG. 6.

FIG. 7.

FIG. 8.

FIG. 5.

FIG. 4.

FIG. 9.

FIG. 3.

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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

1,198,638. Specification of Letters Patent. Patented Sept. 19, 1916.

Application filed February 5, 1913. Serial No. 746,258.

To all whom it may concern:

Be it known that I, ALFRED G. F. KUROWSKI, a citizen of the United States, residing in Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines, particularly to the type of machines which have a rotatable platen mounted in a traveling carriage, and which are adapted to feed a plurality of work-sheets or webs around the platen.

The invention is illustrated in connection with an Underwood front strike typewriting machine in which the work-sheets are fed in at the rear of the carriage. The work-sheets may be supported in any suitable manner, as for example on spools mounted in a frame located behind the machine, as shown in my co-pending application, No. 742,096, filed January 15, 1913.

In addition to the usual inking ribbon I provide a ribbon which is doubled and extends in two leads across the machine in front of the platen; winding on and off a pair of ribbon spools which may be mounted on the supporting frame for the work-sheets. This additional ribbon is fed by pawl and ratchet mechanism connected to be operated by the usual line-space mechanism so that the ribbon is fed each time the platen is rotated to line-space. The ribbon feed mechanism is reversible so that the ribbon may be reeled back and forth on the two spools. Between the ratchet-wheels of the ribbon spools is an actuating dog adapted to be moved by the operation of a reversing shaft into positions to actuate either ratchet-wheel, the reversing shaft also controlling locking dogs for the ratchets.

Extending across the front of the platen is a series of parallel clamping bars, one extending over each work-sheet, the bars being pivoted at their ends to permit a rocking movement. During the printing operations the lower edges of the bars clamp the webs or work-sheets against the platen, but to permit the feed of the webs the bars are spread by rocking their lower edges forward by means of forwardly extending arms operated by a rock-shaft; the latter being automatically operated by the line-spacer. The use of a clamping bar for each work-sheet has the advantage over a single clamping bar of positively separating the work-sheets and preventing the ribbon being dragged, and also provides a separate tearing edge for each sheet.

The invention further comprises means to prevent backward rotation of the platen while the work-sheets are clamped. The release of the platen to permit backward rotation is accomplished by means of a releasing lever which when rocked operates a ribbon clamping device to clamp the ribbons at the end of the platen and place sufficient tension on them to prevent them being dragged downward with the paper; said lever also operates to spread the clamping bars to free the work-sheets, and finally to lift a locking pawl from the line-space wheel. These three operations, namely, the gripping and stretching of the ribbon, the spreading of the clamping bars, and the releasing of the locking pawl take place successively by the single operation of the releasing lever.

Other objects and advantages of the invention will appear hereinafter.

In the accompanying drawings, Figure 1 is a perspective view of mechanism embodying the principles of my invention. Fig. 2 is a sectional elevation view, the section being taken at or near the left-hand end of the platen, and looking toward the left. Fig. 3 is an end elevation view looking in the opposite direction. Fig. 4 is a perspective view of a combined ribbon-guide and clamp, the same being opened out to show the interior structure. Fig. 5 is a sectional view of the ribbon-guide and clamp in position to permit the feeding of the ribbon. Fig. 6 is a view of the same in ribbon clamping position. Fig. 7 is a perspective view of supporting and guiding means for the clamp shown in Figs. 5 and 6. Fig. 8 is a detail view showing spring detents for holding a pawl shifting lever of the ribbon feed mechanism. Fig. 9 is a perspective view of the line-space wheel and its locking pawl. Fig. 10 is a view of parts shown in Fig. 2, but with the platen releasing lever in operated position. Fig. 11 is a sectional detail showing the work-sheet clamping bars in open or spacing position. Fig. 12 is a similar view showing said bars in clamping position. Fig. 13 is a sectional detail of the ribbon-feeding dog and associ-

ated mechanism. Fig. 14 is a sectional view through one of the ribbon spools and its mounting.

The invention as shown is combined with an Underwood typewriting machine, comprising a platen 1 having an axle 2 mounted in a platen frame comprising end plates 3 and 4 and a paper shelf 5 extending across the machine behind the platen. The platen frame is mounted on a traveling carriage 6 guided on a horizontal rod 7 secured to the frame 8 of the machine. The usual mechanism for operating and controlling the movement of the carriage may be provided.

The work-sheets comprise sheets or webs of paper, *a*, *b* and *c*, which may be supplied from rolls (not shown) mounted in a frame 8^a, secured to the carriage 6 by means of bolts 9, or in any other suitable manner. Although the roll holding frame 8^a is herein shown as secured to the carriage and carried thereby, it is to be understood that the present invention is also adapted for use with a roll-holder separately mounted, as disclosed in my co-pending application above referred to. Also, although the present invention is particularly adapted for use for printing on webs of considerable length which are conveniently supplied from rolls of paper, its use is not thus limited, as sheets of ordinary length might be used, or the webs might be continuously supplied, for example, from stacks of folded paper. The webs of paper enter the machine from the rear of the platen and are fed forward between the platen and the usual pressure rolls 10 and 11, beneath the platen and upward to the front of the platen over the printing zone.

Type-bars 12 are operated in the usual manner by finger-keys to bring the type-bars into printing position in front of the platen (see Fig. 12) and print through the ribbon 13, on to the first web *a* in the usual manner. The ribbon 13 is fed through a vibrator 14, which is moved up and down during each printing stroke so that the writing is always visible.

In order to make the printing impressions on the second and third sheets, *b* and *c*, an additional ribbon 16 is provided, which has its ends wound on ribbon spools 17 and 18, mounted on a vertical arm 19, which as shown forms a part of the roll-holding frame 8^a. The ribbon 16 extends downward and forward from the spool 17 to a ribbon guide G, and from thence across the machine between the webs *a* and *b*, directly in front of the platen and over the printing line to guide rollers 20 and 21, and around the roller 20, and returns in front of the roller 21 and between the webs *b* and *c* to the guide G, and thence to the ribbon spool 18. It will thus be seen that the ribbon 16 serves for making impressions on the two webs *b* and *c*.

At the completion of each printing line the platen is rotated for line-spacing by means of a line-space lever 22, which is pivoted at 23 to the carriage-frame and operates a slide-bar 24, to which is pivoted a pawl 25, coöperating with a line-space wheel 26, secured to the platen axle 2. The pawl 25 is formed with a tooth 27, to engage the line-space wheel 26 and rotate the platen, said tooth being held out of engagement during the initial movement of the line-space lever by a supporting member 28, on which the end of the pawl rides, said supporting member 28 being adjustable in the usual manner to regulate the point at which the pawl drops into engagement with the line-space wheel, thereby regulating the line-spacing. A spring operated detent 29 holds the platen in operated position. The slide 24 and lever 22 are returned to their initial position by a spring 30, connected at one end to the slide and at its opposite end to the platen-frame.

The ribbon 13 is adapted to be fed forward at each printing stroke by the usual mechanism (not shown). The ribbon 16, it will be noted, is carried by and moves with the carriage so that during the printing of a line a fresh surface of the ribbon is presented at each printing stroke. It is desirable, however, to feed the ribbon 16 forward a short distance for each line of printing, and for this purpose ribbon feeding mechanism is provided which is operated by the line-space mechanism. This feeding mechanism will now be described.

Each of the ribbon spools 17 and 18 is mounted on a spindle 31, rigidly secured to the arm 19. Each spindle is formed with a longitudinal slot 32, through which extends a spring arm 33, formed with a shoulder 34, to engage the ribbon spool and prevent accidental displacement. By depressing the finger-piece formed by the end of the arm 33, the ribbon spool may be removed from its spindle. Loosely mounted on the upper and lower spindles 31 respectively are ratchet-wheels or racks 35 and 36 adapted to rotate freely on the spindles. Each ratchet-wheel carries a pin 37, adapted to enter an opening 38 in the ribbon spool, and thereby hold the latter against rotation relative to the ratchet-wheel. A spacing washer 39 may be placed between the spool and ratchet-wheel, and is provided with an opening through which the pin 37 extends. The ratchet-wheels are operated by a dog 40, having upper and lower teeth or noses 41 and 42, adapted to coöperate respectively with the ratchet-wheels 35 and 36, the teeth on said wheels being oppositely inclined to permit the dog to rotate the wheels in opposite directions. The dog 40 is pivoted on a rock-shaft 43, journaled in the upper end of a lever 44, pivoted at 45 to the frame 19. The

lower end of the lever 44 is provided with an offset or arm 46, fixed to or formed integral with the lever, said arm carrying or having formed thereon a laterally extending spindle 47, connected to a link 48, pivoted at its forward end to a spindle 49, secured to the rear end of the slide 24. The link 48 is preferably connected loosely to the spindle 47, so as to permit a limited relative movement of the link and spindle in the direction of travel of the machine carriage and spindle, so that such connection will not interfere with the relative movement of the carriage and roll-holder frame when provision is made for such relative movement.

It will be seen that with the above connections the dog 40 will be moved forward from the Fig. 2 position to the Fig. 3 position when the line-space lever 22 is operated, and when the latter is returned the dog 40 will be returned. The ratchet-wheel 35 is thus rotated to feed the ribbon forward as the platen rotates to position for a new line. The ribbon is drawn from the lower spool 18, which is free at this time to rotate, and wound on the upper spool 17. The dog 40 is held up to the ratchet-wheel 35 by a spring 50 connected at one end to the dog and at the other end to a pin 51 on a reversing disk 52, fixed to the reversing shaft 43. This shaft is adapted to be rocked by means of a finger-piece 53 through a limited angle determined by a stud 54, secured to the lever 44, and entering an arc-shaped slot 55 in the disk 52. When the reversing shaft 43 is in the position indicated in Figs. 2 and 3 the dog 40 is yieldingly held against the upper ratchet-wheel 35, and cooperates therewith to rotate the upper ribbon spool. By rotating the finger-piece 53 to its lowered position, as shown in Fig. 1, the opposite end of the slot 55 is brought into engagement with the stop-pin 54, and the pin 51 to which the spring 50 is attached is carried below the shaft 43, and operates to hold the dog in yielding engagement with the lower ratchet-wheel, so that the lower ribbon spool is operated and the direction of the ribbon feed thereby reversed.

The movement of the lever 44 is limited by shoulders 56 and 57, formed by a recess in a bar 58, secured to the arm 19, the lower end of the lever working in said recess. Locking pawls 59 and 60 coöperating with the ratchet-wheels 35 and 36 respectively, are controlled by a rocking lever 61, connected by a pivot 62 to an extension of the arm 19. This lever is adapted to hold either of the locking pawls in inoperative position depending upon the position of the lever. At each end of the lever is a nose 63, adapted to engage an arm of the locking pawl. The lever 61 carries detents 64 (see Fig. 8), seated in hollow bosses 66 formed on the lever, the detents being held by springs 65 against a plate 67, extending from the arm 19. The detents 64 are adapted to seat in depressions 68, formed in the plate 67. When the lever 61 is swung upward to the position shown in Fig. 3, the upper detent 64 engages its recess 68, and holds the lever in such position. The lower nose 63 at this time holds the lower locking pawl free from the ratchet-wheel 36, so that the lower spool is free to pay out ribbon. When the lever 61 is swung downward the lower detent 64 engages its recess 68 to hold the lever. This latter movement of the lever swings the upper nose 63 inward sufficiently to lift the upper locking pawl, while at the same time the lower nose 63 moves outward to release the lower locking pawl.

The lever 61 is operated by means of an eccentric or cam section 69 of the rock-shaft 43, which section enters a slot 70 in the lever. When the dog 40 and lever 61 are in their lifted position, as shown in Fig. 3, the slot 70 is in the path of the cam 69, so that as the lever 44 is oscillated, the cam 69 moves freely into and out of the slot 70 without affecting the position of the lever 61. When it is desired to reverse the ribbon feed, the shaft 43, which may be termed a reversing shaft, is rotated to carry the dog 40 downward, as before explained, and this rotation of the shaft carries the cam 69 downward and with it the lever 61, it being understood that the eccentric 69 is normally seated in the slot 70. The reversing shaft 43 is held against accidental rotation by means of a detent 71, on the end of a U-shaped spring arm 72, fixed to the lever 44, said detent entering holding notches or depressions 73, in the periphery of the disk 52. The outer edges of the slot 70 are preferably curved, as shown, to permit the eccentric 69 to freely enter the slot, and to have a camming action on the lever to reset it if it should become displaced, or in the event of the reversing shaft 43 being rotated while the dog 40 is in a forward position and the eccentric beyond the slot.

The work-sheets *a*, *b* and *c*, are held against the platen by means of a set of rock-bars 74, 75 and 76, which may be termed clamp-bars or spacing-bars, extending across the machine in front of the webs *a*, *b* and *c*, respectively, and located a short distance above the printing line. The front bar 74 may be stiffened and strengthened by an angle bar 74ª secured thereto. These rock-bars serve the triple function of clamping the webs against the platen during the printing operation, spreading or spacing said webs to free the ribbon 16 during line-spacing or backward rotation of the platen, and also serve as knife-blades for severing the work-sheets. Each blade is connected by pivots 77 to arms 78 of a U-shaped frame 79, rigidly secured to carriage-frame 6. Be-

neath the pivots 77 said bars are connected by pivots 83 to forwardly extending arms 80, pivoted at their forward ends to rock arms 81, fixed to a rock-shaft 82, journaled in the carriage-frame. A leaf-spring 84 secured to the end of the rock-shaft 82, bears upwardly against the carriage-frame, and thereby tends to rotate the arms 81 rearwardly, and holds the lower edges of the bars 74, 75 and 76, in the position shown in Fig. 12, in which the webs are clamped against the platen. When the shaft 82 is rocked to move the arms 80 forward, by means presently to be described, the bars are spread to the position shown in Fig. 11, thereby separating the work-sheets and freeing them from the clamp-bars and also from the ribbon 16, so that the platen may be rotated and move the work-sheets either backward or forward without dragging the ribbon with them. The clamp-bars are of different widths and at different angles, as shown in Fig. 12, when in clamping position, so that the lower edges may clamp the webs directly to the platen. To effect the difference in the movement of the three bars required to swing them to the parallel position in Fig. 11, the pivots 77 and 83 of the three bars are different distances apart. The bars are formed with knife-edges 85, for severing the work-sheets. Although a plurality of clamping bars, one for each work-sheet, are herein shown and described, it is to be understood that in some instances a single bar, as for example, the bar 74, may be employed; such bar would alone serve to clamp the work-sheets and when moved to releasing position would permit the work-sheets to be fed forward or the platen rotated backward, the ribbon 16 also being freed. The single knife edge would also serve for severing the work-sheets. The arrangement shown, however, is preferable as it is more positive in its operation of separating the several sheets, which otherwise might cling more or less closely together, and to the ribbon, and moreover when the line-spacer is quickly operated the work-sheets might not be separated or freed from the ribbon quickly enough to prevent the latter being dragged more or less with the work-sheets. Also the ribbon vibrator 14, being rather close to the platen, tends to prevent the work-sheets from separating freely unless positively separated by the plurality of bars, as herein shown. A separate tearing edge for each sheet is also desirable, and operates more satisfactorily, particularly where the sheets are severed by a quick movement. During the operation of the line-space mechanism, the shaft 82 is rocked to spread the spacing-bars by means of an arm 86, fixed to the rock-shaft and engaging a cam projection 87 formed on an extension of the slide 24. When the line-space lever 22 is operated, the slide 24, during the first portion of its movement and before the line-space wheel is operated, lifts the arm 86, and thereby spreads the spacing-bars, as shown in Fig. 11, so that when the platen is rotated the work-sheets are free from the ribbon 16.

The combined ribbon clamp and guide G, as clearly shown in the Figs. 4, 5 and 6, comprises two wings or plates 88 and 89, hinged to the hollow tube pintle 90. Each of these wings is provided near its upper edge with a horizontal guiding slot 91 for the ribbon, and an opening 92 to permit the ribbon to be readily positioned in the slot. Diagonal slots 93 are provided for changing the direction of the ribbon. The wing 88 has an offset portion 94, formed with a vertical opening 95, through which both leads of the ribbon extend. The lead 16′ extending downward from the spool 17, first passes through the slot 91 in the plate 88, from the inner side and thence downward over the outer face of the plate and inward through the slot 93, which changes the direction of the ribbon, which now passes horizontally through the slot 95, and from thence across the machine between the webs *a* and *b* to and around the roller 20, and in front of the roller 21, and from thence between the webs *b* and *c*, back to the guide G. The returning lead 16″ passes through the slot 95, over the outer face of the plate 89, and through the diagonal slot 93, and thence outward through the slot 91, and to the lower spool 18. The guide G is pivotally mounted on a vertical pin 97, secured to the forward end of a rock-arm 98, fixed to a rock-shaft 99. The latter is journaled at its lower end in a horizontal plate 100, which may be an integral extension of the platen-frame. The shaft 99 is journaled near its upper end in a bracket 101, secured to the platen-frame. An arm 102, loosely mounted at one end on the shaft 99, is provided at its forward end with an opening to receive the upper end of the pin 97. The arm 102 is removably held in this position by means of a coil-spring 103, extending between the arms 98 and 102; a reinforcing pin 104, also extending between said arms, may be provided. The forward end of the arm 102 may be lifted from the pin 97 and swung to one side to permit removal of the clamp G.

Fixed to the rock-shaft 99 is a rearwardly extending arm 105, carrying a roller 106 in the path of a cam 107, on a sliding bar 108, extending through a guide 109. When the cam 107 is moved rearwardly by means which will be described later, the arm 105 rocks the shaft 99, and with it the arm 98, to move the clamp G from the position shown in Fig. 5, to that shown in Fig. 6. During this movement the wings of the clamp are brought to a clamping position by means of

guiding pins 110, 111 and 112, secured to the plate 100. The pin 111 is positioned between the two wings or jaws of the clamp, and together with the pin 110, guides the wing 88 in substantially a straight line. The pin 112 is in contact with a cam projection or flange 113, on the wing 89, which cams the wing 89 inward to the clamping position shown in Fig. 6. The wing 88 is formed with a boss 114, adapted to seat in a recess 115 in the wing 89 and thereby securely clamp the ribbon. A leaf-spring 116, secured to the inner face of the wing 88, serves to spread the clamp and release the ribbon when the clamp is returned. A coil-spring 99', mounted on the pin 99 and connected at one end to the arm 98, returns the clamp G when the cam 107 is retracted. It will be seen that the operation of the clamp G serves not only to clamp the ribbon, but also to stretch it tightly across the face of the platen, so that the latter may be rotated backward without danger of the ribbon being dragged downward with the work-sheets. The platen is locked against rotation in a backward direction while the spacing-bars 74, 75 and 76 are in clamping position and the clamp G in position to permit the ribbon feed, by means of a locking pawl or dog 117 coöperating with the line-space wheel 26.

In order to permit the platen to be rotated backward a releasing lever 118 is provided with means to operate the clamp G; spread the spacing-bars 74, 75 and 76; and release the locking pawl 117. This releasing lever is connected to or formed integral with a wing 119, to which the forward end of the slide bar 108 is connected by a pivot 120, for operating said bar and thereby operating the ribbon clamp G through the train of connections already described. The spacing-bars in front of the platen are spread by the operation of the releasing lever 118 through means of a lever 126, connected by a pivot 127 to the platen-frame and at its rear end carrying a pin 128, in contact with a cam surface 129 formed on the wing 119. The forward end of the lever 126, carries a pin 130, which engages beneath the rock-arm 86. When the releasing lever is depressed, the cam 129 rocks the lever 126 and lifts the arm 86, thereby spreading the space-bars through the connections already described. The locking pawl 117 is secured to a rock-shaft 121, which extends through the platen-frame and has secured to its opposite end a dog 122 in the path of a tail 123, on the end of a U-shaped arm 124, fixed to the wing 119. When the releasing lever 118 is depressed the arm 124 is carried forward so that the tail 123 lifts the dog 122, and releases the locking pawl 117. The pawl 117 is held against the line-space wheel by a spring 125. The movement of the lever 118 is limited in both directions by a pin 131, secured to the platen-frame and engaging shoulders formed on the wing 119. A coil-spring 132 serves to return the releasing lever 118 after it has been depressed. The operations effected by the releasing lever 118 take place in the following order: First—the clamp G is operated to grip and then stretch the ribbon, this operation taking place during the initial movement of the releasing lever; second—the lever 126 operates to spread the spacing-bars; and, finally, the locking pawl 117 is lifted. Thus the platen is free to be rotated backward only when the ribbon is held taut and the spacing-bars spread so that there is no danger of the ribbon being dragged downward with the work-sheets.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim—

1. In a typewriting machine, the combination of ribbon spools, a ribbon, a rotary platen, line-space mechanism for rotating the platen, ratchets connected to said spools, a pawl shiftable into driving relation to either ratchet, and an operating connection from the line-space mechanism to the pawl for driving the pawl in both directions.

2. In ribbon feeding mechanism, the combination of ribbon spools, ratchet-wheels, an operating dog located between said wheels, and movable into operative relation to either wheel, pivoted locking dogs for said wheels, a releasing device for holding either of said locking dogs in released position and permitting the other locking dog to engage its ratchet, and means to simultaneously shift the operating dog into position to coöperate with either ratchet-wheel and actuate the releasing device to lift the locking dog from the opposite wheel.

3. In ribbon feeding mechanism, the combination of ribbon spool-carrying spindles, ratchet-wheels connected thereto, an operating dog movable into positions to coöperate with either ratchet-wheel, pivoted locking dogs to prevent backward rotation of the ratchet-wheels, an oscillating member pivoted on an axis parallel with said spindles for holding either locking dog in released position, and a reversing device for simultaneously shifting the operating dog into position to operate one ratchet and move said shifting device into position to lift the opposite locking dog.

4. In ribbon feeding mechanism, the combination of spool-holding spindles, ratchet-wheels connected thereto, an operating dog between said wheels, a rock-shaft on which said dog is pivoted, a disk secured to said shaft, and a spring connected to said dog and disk for holding the dog in positions to

coöperate with either ratchet-wheel, said disk being rotatable with the rock-shaft to shift the spring, and thereby shift the position of the dog.

5. In ribbon feeding mechanism, the combination of spool-holding spindles, ratchet-wheels connected thereto, an operating dog adapted to coöperate with either ratchet-wheel, a lever carrying said dog, a shaft journaled in said lever, an eccentric on said shaft, a rocking member provided with a slot in the path of said eccentric and adapted to receive the latter when the operating dog is in retracted position, locking pawls operated by said rocking member, said shaft being rotatable to rock said member, and means to shift the operating dog when said shaft is rotated.

6. In ribbon feeding mechanism, the combination of spool-holding spindles, ratchet-wheels connected thereto, locking dogs, a pivoted member adapted to engage said dogs and lift either dog from its ratchet, means for holding said member in its shifted position, an operating dog shiftable into positions to coöperate with either of the ratchet-wheels, and means to simultaneously shift said operating dog and said member.

7. In a typewriting machine, the combination of a rotary platen, mechanism to rotate the platen, ribbon feeding mechanism comprising a dog and ratchet wheels, a lever carrying said dog, means on said lever to hold the dog in coöperative relation to either ratchet wheel, and a connection between said lever and the said platen rotating mechanism.

8. In a typewriting machine, the combination of a rotary platen, line-space mechanism, spool-carrying spindles, ratchet-wheels connected thereto, an operating dog between said wheels, a lever carrying said dog, means for shifting the dog into coöperative relation to either ratchet-wheel, and a link connecting said lever to the line-space mechanism.

9. In a typewriting machine, the combination of a rotary platen, a line-space wheel secured to the platen axle, an operating dog, a slide to which said dog is pivoted, a lever to operate said slide, a ribbon spool-holding spindle, a ratchet-wheel connected thereto, a dog for operating said ratchet-wheel, a lever carrying said last-named dog, and a link connecting said last-named lever to said slide.

10. In a typewriting machine, the combination of a rotary platen, line-space mechanism, ribbon feed mechanism, and a link connecting the line-space mechanism with the ribbon feed mechanism, the connection with the ribbon feed mechanism permitting a limited movement of the ribbon feed mechanism relatively to the platen in the direction of the platen axle.

11. In a typewriting machine, a combined ribbon guide and clamp comprising hinged plates, and means to guide a ribbon between said plates, the latter movable together to clamp the ribbon.

12. In combination, a ribbon guiding mechanism comprising a pair of hinged members each provided with a diagonal slot through which a ribbon is guided and its direction changed, and means for guiding the ribbon at the point of entrance and exit to and from said guiding mechanism.

13. In combination, a combined ribbon guide and clamp comprising substantially parallel members, and means for guiding a ribbon between said members and permitting the ribbon to be fed therethrough, said members being movable together to clamp the ribbon therebetween.

14. A ribbon clamp comprising a pair of hinged plates, means to guide a ribbon between said plates, a boss formed on one plate, the other plate being formed with a recess or depression to receive said boss and clamp the ribbon, and a spring between said plates for normally holding them in ribbon releasing position.

15. A combined ribbon guide and clamp comprising a pair of hinged plates, each formed with a slot perpendicular to the hinge, and a diagonal slot, one of said plates having a lateral offset provided with an opening through which the ribbon is adapted to extend.

16. In a typewriting machine, the combination of a combined ribbon guide and clamp, a supporting plate, a pivoted arm carrying said clamp, and guides carried by said plate in position to operate the clamp when the latter is moved by said arm.

17. In a typewriting machine, the combination of a platen, a ribbon extending lengthwise of the platen, a combined ribbon guide and clamp through which the ribbon extends, and means for operating said clamp to grip and stretch the ribbon.

18. In a typewriting machine, the combination of a rotary platen, a ribbon extending longitudinally of the platen and adapted to be interposed between work-sheets, a locking mechanism to prevent rotation of the platen in one direction, a ribbon gripping device, and means to release said locking mechanism and operate the gripping device and stretch the ribbon prior to the rotation of the platen, and thereby prevent the ribbon from being dragged with the work-sheets.

19. In a typewriting machine, the combination of a rotary platen, platen locking means, a ribbon extending longitudinally of the platen in position to be interposed between work-sheets on the platen, and means to place an increased tension on the ribbon when said locking means is released.

20. In a typewriting machine, the combination of a rotary platen, bars extending longitudinally of the platen and each supported adjacent the ends of the platen, and means to operate said bars into and out of position to clamp work-sheets against the platen.

21. In a typewriting machine of the front strike type, the combination of a rotary platen, parallel bars extending lengthwise of the platen above the printing line, said bars being movable into and out of position to clamp work-sheets against the platen, and supports for both ends of the bars adjacent the ends of the platen.

22. In a typewriting machine, the combination of a rotary platen, a series of bars extending longitudinally of the platen, said bars being spaced to receive work-sheets, and means for swinging the bars into position to clamp the work-sheets against the platen, the clamping edges of said bars being stepped to permit a direct clamping action of each bar and the platen on the interposed sheet or sheets.

23. In a typewriting machine of the front strike type, the combination of a rotary platen, a series of bars extending longitudinally of the platen above the printing line, said bars being pivoted to permit the lower edges to be swung inward and grip the work-sheets, and mechanism to operate said bars.

24. In a typewriting machine of the front strike type, the combination of a rotary platen, a series of bars extending longitudinally of the platen above the printing line, said bars being pivoted at their ends to permit the lower edges to be swung inward and clamp the work-sheets, mechanism to operate said bars, line-spacing mechanism, and operating connections between said mechanisms.

25. In a typewriting machine, the combination of a rotary platen, bars extending longitudinally of the platen and adapted to clamp work-sheets against the platen, a ribbon extending longitudinally of the platen beneath said bars, said ribbon and bars being adapted to be interposed between and over the work-sheets, means for rotating the platen, and mechanism to move said bars out of clamping position and spread the work-sheets, thereby permitting the latter to be fed forward with the platen, and also preventing the ribbon from being dragged with the work-sheets.

26. In a typewriting machine, the combination of a rotary platen, a series of bars extending longitudinally of the platen, a ribbon extending longitudinally of the platen in proximity to said bars, means to hold said bars in position to clamp work-sheets against the platen, and mechanism to remove the bars to releasing position and apply tension to said ribbon.

27. In a typewriting machine, the combination of a rotary platen, a ribbon extending longitudinally of the platen and adapted to be interposed between work-sheets, clamping bars also extending along the platen and adapted to clamp the work-sheets against the platen, mechanism for moving the clamping bars into position to release the work-sheets, and means to feed the ribbon while the work-sheets are thus released.

28. In a typewriting machine, the combination of a rotary platen, line-space mechanism for rotating the platen, clamping bars extending longitudinally of the platen, a frame in which the ends of said bars are pivoted, arms having a pivoted connection with said bars, a rock-shaft having rock-arms pivoted to said first-named arms, and means operated by the line-space mechanism to rock said shaft and move the clamping bars out of clamping position prior to the rotation of the platen when the line-space mechanism is operated.

29. In a typewriting machine of the front strike type, the combination of a rotary platen, a line-space wheel, a pawl coöperating with said wheel, a slide carrying said pawl, a line-space lever for operating the slide, a series of clamping bars extending longitudinally of the platen in position to clamp a series of work-sheets against the platen, said bars being pivoted at their ends to permit a rocking movement of the bars into and out of position to clamp the work-sheets against the platen, arms connected to said bars for rocking the latter, a rock-shaft operatively connected to said arms, a cam arm secured to said rock-shaft, and an extension on said slide in position to engage the cam arm and rock said bars to releasing position prior to the rotation of the platen when the line-space lever is operated.

30. In a typewriting machine, the combination of a platen, means for rotating the platen, a device to lock the platen against backward rotation, means to clamp a work-sheet against the platen, and a device for releasing said clamping means and said locking device.

31. In a typewriting machine, the combination of a platen, mechanism to rotate the platen, a device to hold the platen against backward rotation, means to feed a plurality of work-sheets over the platen, means to clamp the work-sheets in position, and a releasing device to release said clamping means and then release the platen to permit backward rotation of the latter.

32. In a typewriting machine, the com-

bination of a platen, a line-space wheel, a locking dog engaging said wheel, means to clamp work-sheets against the platen, a releasing lever, and mechanism operated thereby to release said clamping means and then lift said locking dog.

33. In a typewriting machine, the combination of a platen, line-space mechanism comprising a line-space wheel and a locking dog therefor, clamping bars extending across the machine in front of the platen, a ribbon extending longitudinally of the platen beneath said bars, said ribbon and bars being in position to be placed between and over work-sheets, mechanism for spreading said bars, a releasing lever for operating said mechanism, and operating connections between said lever and locking dog for lifting the latter off said line-space wheel when the releasing lever is operated.

34. In a typewriting machine, the combination of a platen, clamping bars extending longitudinally of the platen and adapted to clamp work-sheets against the platen, a ribbon extending longitudinally of the platen beneath said bars, a releasing lever, and means operated thereby to release the clamping bars and place tension on the ribbon.

35. In a typewriting machine, the combination of a platen, a clamping bar extending longitudinally of the platen, and adapted to clamp work-sheets against the platen, a ribbon extending longitudinally of the platen beneath said bar, a releasing lever, and means operated thereby to release the clamping bar and place tension on the ribbon.

36. In a typewriting machine, the combination of a rotary platen, a device to lock the platen against backward rotation, means to clamp work-sheets against the platen, a ribbon, a releasing lever, and means operated by the lever to release the clamping means, place tension on the ribbon, and release the platen lock.

37. In a typewriting machine, the combination of a roll platen, and work-sheet clamping bars extending longitudinally of the platen and holding the work-sheets against the platen while being typewritten upon, said bars being formed with knife edges.

38. In a typewriting machine, the combination of a roll platen, pivoted clamping bars extending longitudinally of the platen, and means for swinging said bars on their pivots and bringing the lower edges into clamping engagement with work-sheets on the platen, the upper edges of said bars constituting knife edges for severing the work-sheets.

39. In a typewriting machine, the combination with a ribbon, and means to feed the ribbon over the printing point, of a clamp through which the ribbon is fed, and means to actuate said clamp to grip the ribbon.

40. In a typewriting machine, the combination with a ribbon, and means to feed the ribbon over the printing point, of a clamp through which the ribbon is fed, means to actuate said clamp to grip the ribbon, and means to move said clamp while the ribbon is gripped thereby into position to increase the tension on the ribbon.

41. In a typewriting machine, a combined ribbon guide and clamp, a ribbon extending therethrough, and means to actuate the clamp to grip the ribbon and then move the clamp to tension the ribbon.

42. In a typewriting machine, the combination with a roller platen, of work-sheet clamping bars extending longitudinally of the platen, said bars having work-sheet clamping edges and formed with tearing edges opposite the clamping edges.

43. In a typewriting machine, the combination with a roller platen, of a work-sheet clamping bar having one edge movable into position to clamp the work-sheet against the platen and an opposite tearing edge for severing the work-sheet.

44. In a typewriting machine, the combination with a roller platen, of clamping bars extending along the platen and spaced to be interleaved by the work pieces, and means for moving said bars into and out of positions to clamp the interposed work piece or pieces against the platen.

45. In a typewriting machine, the combination with a rotary platen, of a ribbon extending longitudinally of the platen in position to be interposed between work pieces upon the platen, and means to temporarily place an increased tension on the ribbon when it is desired to rotate the platen.

46. In a typewriting machine of the front-strike type, the combination with a rotary platen, of a series of bars extending longitudinally of the platen above the printing line, said bars movable to bring one edge of each bar inward to grip the work pieces, and mechanism to operate said bars.

47. In a typewriting machine, the combination with a platen, of platen-rotating means, a device to clamp a work piece against the platen, and a connection between said device and the platen-rotating means for moving said device out of clamping position when said means is operated to rotate the platen.

48. In a typewriting machine, the combination with a rotary platen, of a line-space mechanism, a bar to clamp a work piece against the platen, and a connection between the line-space mechanism and said bar to move the latter away from the platen when the line-space mechanism is operated.

49. In a typewriting machine, the combination with a rotary platen, of line-space

mechanism, a clamping device to hold the work pieces against the platen, a connection between the line-space mechanism and said device for moving the latter to a released position, and means independent of the line-space mechanism for actuating said clamping device.

50. In a typewriting machine, the combination of a rotary platen, line-space mechanism, ribbon spools located at the same end of the platen, a ribbon-spool-driving device shiftable into operative relation to either spool, said device operated by the line-space mechanism to feed the ribbon when the platen is rotated for line-spacing, and means for guiding the ribbon from one spool longitudinally of the platen over the printing line to the opposite end of the platen, and from thence returning the ribbon along the platen over the printing line and to the other spool, the two leads of ribbon extending along the platen being supported to overlie work pieces on the platen, the ribbon and work pieces being held against the platen along the printing line to permit types to print through the ribbon onto the work pieces.

51. In a typewriting machine, the combination of a rotary platen, ribbon spools located in a plane perpendicular to the axis of the platen and at one end of the platen, a ribbon having leads extending from both spools to a point adjacent one end of the platen and both guided from said point longitudinally of the platen along the printing line to the opposite end of the platen, one lead supported to extend between superposed work pieces along the printing line, and the other lead supported to overlie the said work pieces, the ribbon and work pieces being held closely against the platen along the printing line, to permit types to print through the ribbon onto the work pieces, and means to spread the work pieces and prevent them from binding the ribbon as the latter is fed.

52. In a typewriting machine, the combination of a carriage, a rotary platen thereon, ribbon spools located at one end of the platen and mounted to travel with the carriage, a guide roller at the opposite end of the platen, a ribbon extending from one spool longitudinally of the platen over the printing point and around said guide roller, and back over the printing point and to the other spool, means to rotate said spools to feed the ribbon along the platen, means to support the ribbon and underlying work pieces against the platen along the printing line thereof to permit types to print through the ribbon onto the work pieces, and means to free the ribbon from the work pieces when the ribbon-feeding means is operated.

53. In a typewriting machine, the combination of a roller platen, ribbon spools at one end of the platen, a ribbon winding on and off said spools, a line-space lever and means operated thereby to rotate the platen, a driver operated by said lever and shiftable into operative relation to either ribbon spool, for rotating the spool to feed the ribbon, and means to guide the ribbon in two leads extending longitudinally of the platen along the printing line thereof, and feeding in opposite directions over the printing line of the platen, said leads of ribbon and underlying work pieces being held against the platen along the printing line, to permit types to print through the ribbon onto the work pieces.

54. In a typewriting machine, the combination of a rotary platen, a web of manifolding material, a device for feeding different portions of said web simultaneously in opposite directions lengthwise of the platen, means to clamp said portions of web and underlying work pieces against the platen along the printing line thereof, to permit types to print through said material onto the work pieces, means to release and spread said web portions and work-pieces to permit the platen to rotate and advance the work-pieces relatively to the said web portions, and means to adjust said feeding device to reverse the direction of feed.

55. In a typewriting machine, the combination of a platen, line-spacing mechanism comprising a lever to rotate the platen, an inking ribbon extending in a plurality of leads along the face of the platen over the printing line, means to hold said ribbon and work pieces with which the ribbon is interleaved against the face of the platen along the printing line, ribbon-feeding mechanism operable to advance different leads of the ribbon simultaneously in opposite directions along the platen, and means operated by the line-spacing lever to release said holding means to prevent the work pieces from binding on the ribbon, and then to operate the said ribbon-feeding mechanism.

56. In a typewriting machine, the combination of a rotary platen, ribbon spools located behind and near the same end of the platen, a ribbon feeding from one spool to the other, a combined ribbon guide and clamp, means coöperating therewith for guiding the ribbon from both spools to the forward side of the platen, and from thence longitudinally of the platen in superposed relation over the printing point and to the opposite end of the platen, the ribbon and work-sheets on the platen being held in superposed relation against the platen along the printing line thereof, to permit types which strike against the platen to print through the ribbon onto the work-sheets, and means to actuate said combined guide and clamp, to clamp the ribbon and place tension

on that portion thereof extending longitudinally of the platen.

57. In a typewriting machine of the front-strike type, the combination of a rotary platen and coöperating means to feed a plurality of work-sheets over the platen, ribbon spools at the same end of the platen, a ribbon extending from said spools in a plurality of leads across the front face of the platen in position to be interposed between the work-sheets and held with the work-sheets against the platen, means for guiding, supporting and feeding said ribbon, a device cooperating with the ribbon-feeding means to spread the work-sheets and prevent them from binding on the ribbon as the latter is fed, a ribbon vibrator vibratable over the printing point, and a second ribbon vibrated by said vibrator.

58. In a typewriting machine, the combination with a carriage, of a revoluble platen thereon, ribbon spools mounted to travel with the carriage, a driver shiftable into driving relation with said spools alternatively, a ribbon having its ends wound on the spools and an intermediate portion doubled and extending along the platen and over the printing point on the platen, and arranged to be interleaved with work pieces on the platen, means for guiding the ribbon, means to actuate said driver for operating said spools to feed the ribbon from one spool to the other, platen locking means, a device for releasing the platen from said locking means, and means controlled by said releasing device to apply tension to the ribbon, to thereby prevent the ribbon from being dragged with the work-pieces as the platen is rotated.

59. In a typewriting machine, the combination with a carriage, of a revoluble platen thereon, mechanism to rotate the platen, an inking strip, receiving spools on the carriage for both ends of said strip adjacent each other, and a pawl and ratchet device operated by said mechanism to feed said strip alternatively in either direction.

60. In a typewriting machine, the combination with a carriage, of a rotary platen thereon, line-space mechanism, ribbon spools mounted to travel with the carriage, ratchets connected to said spools and located adjacent each other, a driver shiftable into operative relation to either ratchet for operating the spools, a ribbon feeding from one spool to the other and extending in two leads along the printing line on the platen in position to be interleaved by work pieces running over the platen, and operating means connecting said driver to the line-space mechanism.

61. In a typewriting machine, the combination of a rotary platen, a ribbon extending longitudinally of the platen and adapted to be interposed between work-sheets, means to rotate the platen and feed the ribbon longitudinally thereof, a lock to prevent backward rotation of the platen, and a device for clamping and stretching the ribbon and releasing said lock.

62. In a typewriting machine, the combination with a rotary platen, of ribbon spools adjacent each other and at the same end of the platen, a ribbon feeding from one spool to the other, and guided in two leads each extending along the platen over the printing point in position to be interleaved by work-sheets running over the platen, line-space mechanism for rotating the platen, and a device actuated by said line-space mechanism and shiftable into operative relation to said spools alternatively for rotating either ribbon spool and thereby feeding the ribbon over the printing point from either spool to the other.

63. In a typewriting machine, the combination with a rotary platen, of means cooperating therewith to feed work pieces over the platen past the printing line, a web of transfer material extending along the face of the platen between the work pieces along the printing line, clamping means to engage the work pieces along the platen in advance of the printing line, and hold the work pieces and said web against the platen, means for feeding said web longitudinally of the platen, and a device for releasing the work-piece-clamping means to free the work pieces and prevent them from binding on the said web as the latter is fed.

64. In a typewriting machine, the combination with a rotary platen, of means coöperating therewith to feed work pieces over the platen past the printing line, a web of transfer material extending along the face of the platen between the work pieces along the printing line, clamping means to engage the work pieces along the platen in advance of the printing line, and hold the work pieces and said web against the platen, means for feeding said web longitudinally of the platen, a device for releasing the work-piece-clamping means to free the work pieces and prevent them from binding on the said web as the latter is fed, line-space mechanism comprising a lever to rotate the platen, said lever operable to actuate said clamp-releasing means prior to the rotation of the platen when said lever is operated, and connections between said lever and the said web-feeding means to actuate the latter when said lever is operated.

65. In a typewriting machine, the combination with a rotatable platen, of means coöperating therewith to feed superposed work pieces over the platen and past the printing line, webs of transfer material extending in a plurality of leads along the face of the platen over the printing line and interleaved with said work pieces, a series

of clamping bars extending along the platen and located in advance of the printing line, said bars and work pieces being arranged in alternation, the outer bar overlying all of the work pieces, said bars clamping the work pieces against the platen and holding said webs and work-pieces against the platen along the printing line, means for feeding said webs along the platen, and means to move said clamping bars to a released position in which they hold the work pieces separated, permitting them to be advanced by the rotation of the platen, and also freeing the said webs to permit the latter to be fed along the platen.

66. In a typewriting machine, the combination with a rotary platen and work-piece feeding means, of an inking ribbon extending along the face of the platen between the work pieces thereon, a clamping bar to engage the work pieces along the platen in advance of the printing line to hold the work pieces and said ribbon against the platen, and means to actuate the clamping bar to release the work pieces and permit the ribbon to be fed lengthwise of the platen.

67. In a typewriting machine, the combination with a rotary platen, of means coöperating therewith to feed work pieces over the platen and past the printing line, a ribbon extending along the face of the platen over the printing line in position to be interposed between work pieces on the platen, a clamping bar extending lengthwise of the platen to engage the work pieces in advance of the printing line and clamp said work pieces and ribbon against the platen along the printing line, line-space mechanism comprising a lever operable to rotate the platen, and means actuated by said lever prior to the rotation of the platen, to release said clamping bar and free the work pieces to permit them to be fed forward relative to the clamping bar as the platen is rotated.

68. In a typewriting machine, the combination with a rotary platen, of means cooperating therewith to feed work pieces over the platen and past the printing line, a ribbon extending along the face of the platen over the printing line in position to be interposed between work pieces on the platen, a clamping bar extending lengthwise of the platen to engage the work pieces in advance of the printing line and clamp said work pieces and the ribbon against the platen along the printing line, means to lock the platen against backward rotation, a key to release said locking means, and means operated by said release key to move the clamping bar away from the platen to release the work pieces.

69. In a typewriting machine, the combination with a rotary platen, of means cooperating therewith to feed work pieces over the platen and past the printing line, a ribbon extending along the face of the platen over the printing line in position to be interposed between work pieces on the platen, a clamping bar extending lengthwise of the platen to engage the work pieces in advance of the printing line and clamp said work pieces and the ribbon against the platen along the printing line, means to lock the platen against backward rotation, a key to release said locking means, means operated by said release key to move the clamping bar away from the platen to release the work pieces, and means operated by said key to grip the ribbon and place it under tension to prevent it from being dragged with the work pieces when the platen is rotated backward.

70. In a typewriting machine, the combination with a rotary platen, of means cooperating therewith to feed work pieces over the platen and past the printing line, a ribbon extending along the face of the platen over the printing line in position to be interposed between work pieces on the platen, a clamping bar extending lengthwise of the platen to engage the work pieces in advance of the printing line and clamp said work pieces and the ribbon against the platen along the printing line, a key to lift the clamping bar and release the work pieces, and means operated by said key to grip and stretch the ribbon and thereby prevent it from being dragged with the work-pieces when the platen is rotated.

71. In a typewriting machine, the combination with a rotary platen, of feed rolls running thereon to feed work pieces around the platen and past the printing line, an inking ribbon, means to support and guide the ribbon longitudinally of the platen over the printing line in position to extend between the work pieces along the printing line, work-piece-clamping means extending lengthwise of the platen in advance of the printing line to clamp the work pieces against the platen and thereby hold them and the ribbon closely against the platen along the printing line, a line-space lever, mechanism operated thereby to rotate the platen in a forward direction, a lock to prevent backward rotation of the platen, a lever to release said lock, and means actuated by each of said levers to release said work-piece-clamping means and spread the work pieces, thereby permitting the latter to move with the platen and relatively to the ribbon as the platen is rotated in either direction.

72. In a typewriting machine, the combination with a rotary platen, of feed rolls running thereon to feed work pieces around the platen and past the printing line, an inking ribbon, means to support and guide the ribbon longitudinally of the platen over the printing line in position to extend

between the work pieces along the printing line, work-piece-clamping means extending lengthwise of the platen in advance of the printing line to clamp the work pieces against the platen and thereby hold them and the ribbon closely against the platen along the printing line, a line-space lever, mechanism operated thereby to rotate the platen in a forward direction, a lock to prevent backward rotation of the platen, a lever to release said lock, means actuated by each of said levers to release said work-piece-clamping means and spread the work pieces, thereby permitting the latter to move with the platen and relatively to the ribbon as the platen is rotated in either direction, said ribbon-supporting and guiding means comprising a clamp through which the ribbon is threaded, and means controlled by said lock-releasing lever to actuate the clamp to grip the ribbon and then stretch the ribbon lengthwise of the platen, to prevent it from being dragged with the work pieces when the platen is rotated backward.

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Witnesses:

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