H. H. STEELE.

TYPE WRITING MACHINE.

APPLICATION FILED APR. 3, 1913.

1,096,646.

Patented May 12, 1914.

2 SHEETS—SHEET 1.

FIG. 2.

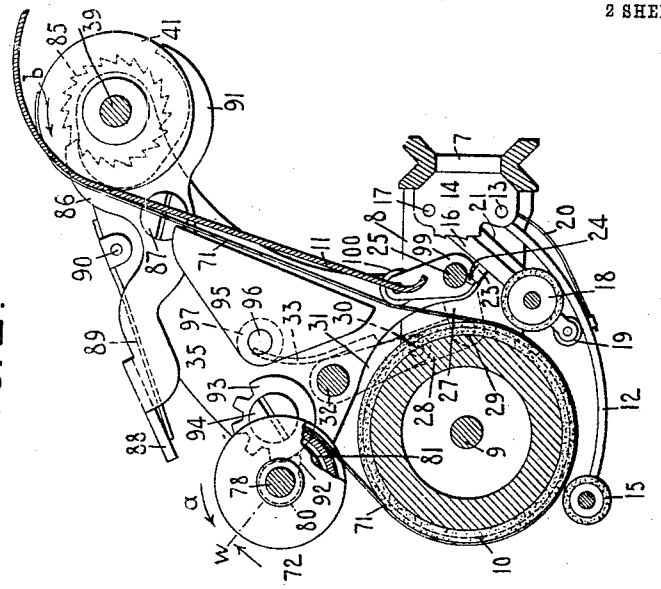
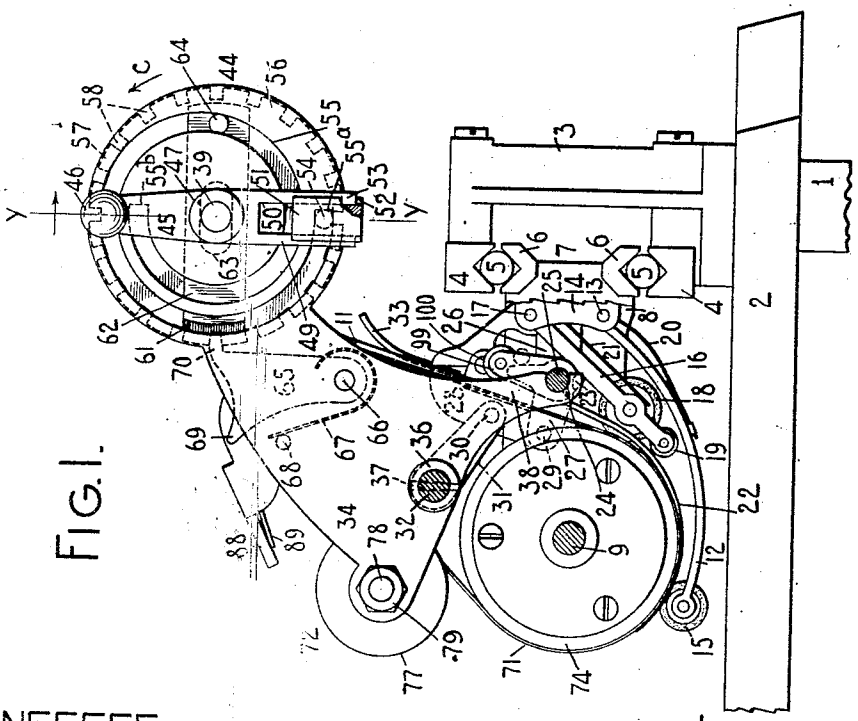


FIG. 1.



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2 SHEETS—SHEET 2.

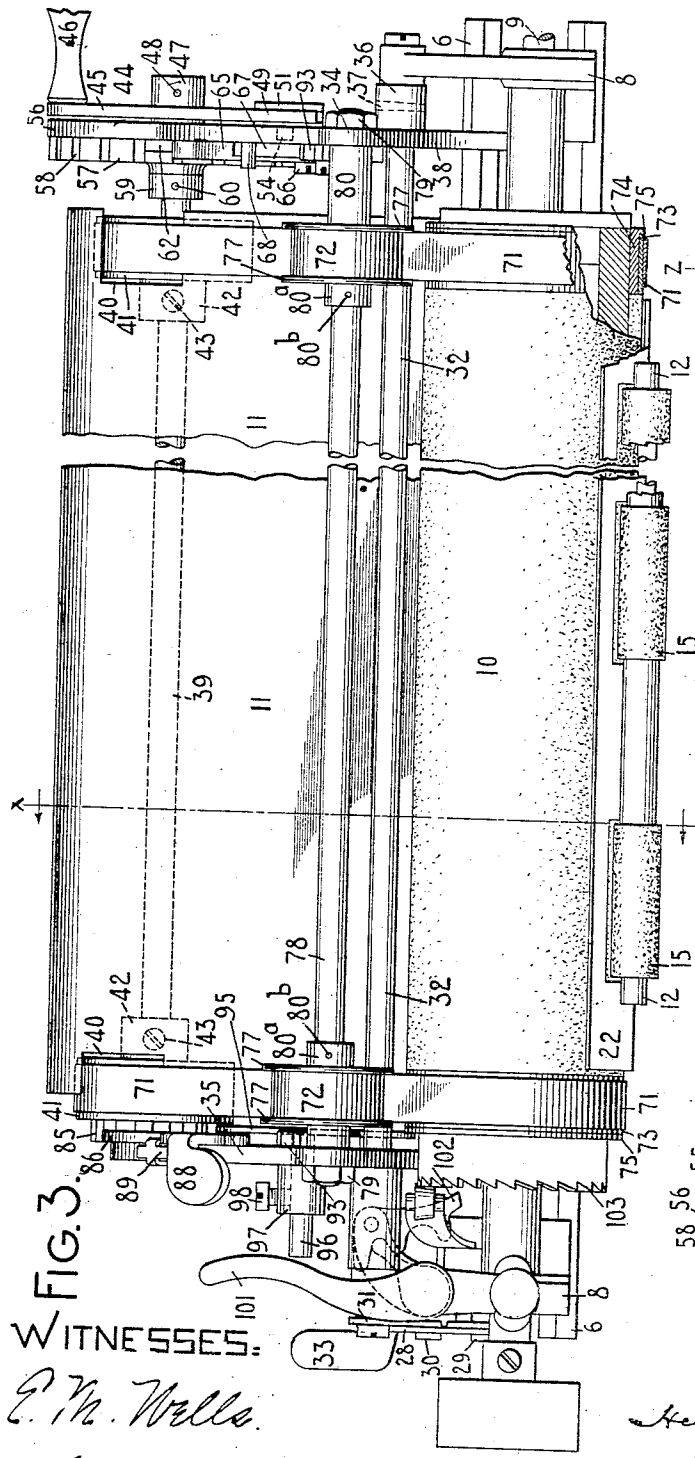


FIG. 3.

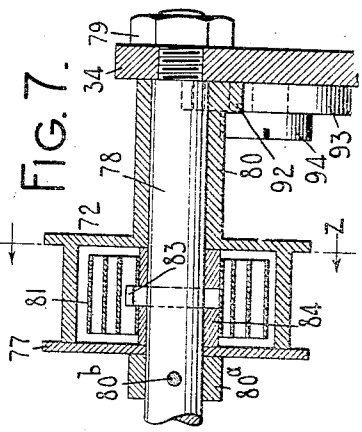


FIG. 7.

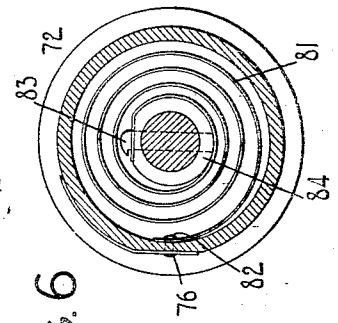


FIG. 6

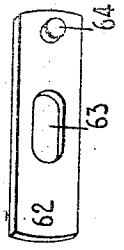


FIG. 5.

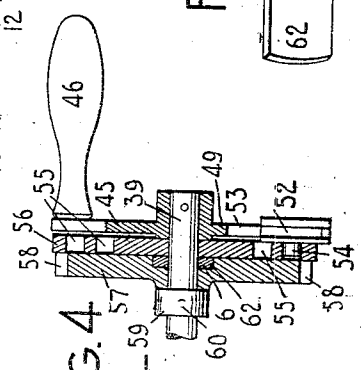


FIG. 4

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UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPEWRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,096,646. Specification of Letters Patent. Patented May 12, 1914.

Application filed April 3, 1913. Serial No. 758,562.

To all whom it may concern:

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga 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 and more particularly to means for controlling the work sheets.

One object of the invention, generally stated, is to provide improved means for controlling work sheets and the relation thereof to the platen, the construction having been devised more particularly for use in condensed record work.

More specifically stated, the invention has the following objects in view: (1st) To provide improved means by which a predetermined extent of movement of a work sheet may be effected independently of the platen. (2nd) To provide means by which a definite predetermined extent of forward and backward movement of a condensed record sheet may be effected independently of the platen. (3rd) To provide improved means for effectively holding a condensed record sheet under different conditions of use and when it is out of control of the ordinary paper feed devices. (4th) To provide improved automatically operating means for throwing auxiliary work sheet feeding means into operation when the ordinary paper feed devices are released. (5th) To provide one or more flexible bands that serve as paper guides during the normal feed of a work sheet but which are also operative to move a work sheet independently of the platen. (6th) To provide means for affording slack in the band or bands when they are to be used as guides and for placing them under tension when they are to be used to feed a work sheet. (7th) To provide spring means for moving a work sheet independently of the platen. (8th) To provide hand actuated means for moving a work sheet in one direction in opposition to said spring means and thereby wind the spring of said spring means so that the latter is effective to move the work sheet in the opposite direction; and (9th) to provide detent means for restraining the action of the spring means and for releasing the detent at will and automatically applying a brake to retard the feed of a work sheet under the action of said spring means.

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

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a fragmentary side view with parts broken and sectioned away, the view showing the upper portion of a typewriting machine embodying my invention. Fig. 2 is a vertical fore and aft sectional view with parts broken away, the section being taken on a line x—x of Fig. 3 and looking in the direction of the arrows at said line. Fig. 3 is a fragmentary front elevation of the parts shown in Fig. 1. Fig. 4 is a detail transverse sectional view of a portion of the mechanism, the section being taken on the line y—y of Fig. 1 and looking in the direction of the arrow at said line. Fig. 5 is a detail perspective view of the adjustable stop carrying slide. Fig. 6 is a detail transverse sectional view of the parts represented in Fig. 7, the section being taken on the line z—z of Fig. 7 and looking in the direction of the arrows at said line. Fig. 7 is a detail fragmentary central sectional view taken through one of the spring drums on the line w of Fig. 2 and looking in the direction of the arrow at said line.

I have shown my invention embodied, in the present instance, in a Monarch machine in which the invention may be readily incorporated without modifying, or materially modifying, the structural features of said machine as they now exist. It should be understood, however, that the invention may be embodied in various styles of typewriting machines. In the drawings I have shown only so much of the typewriting machine as may be necessary to arrive at an understanding of my invention. The parts of the machine not shown may be understood to be of the usual construction.

The frame of the machine comprises corner posts 1 and a top plate 2. Upwardly

extending brackets 3 are secured to the top plate and provide a support for oppositely grooved fixed guide rails 4 which receive anti-friction balls or rollers 5 that are likewise received in oppositely grooved guide rails 6 of a guide or supporting bar designated as a whole by the reference numeral 7. Forwardly projecting end bars 8 project from the bar 7 and are provided with bearings for a platen shaft 9 which supports a rotative platen 10. The carriage comprising the bars 7 and 8 is thus supported for movement from side to side of the machine over the top plate under control of the escapement mechanism (not shown). The usual upwardly and rearwardly striking type bars (not shown) are adapted to strike against the front face of the platen.

The paper feed devices usually employed in the Monarch machine, except the paper fingers, are embodied in the construction in the present instance. However, I have not deemed it necessary to show the platen scale. When the platen scale is employed it is preferably thrown off in the usual manner by releasing the paper feed rollers. A paper table 11 is supported in place on the carriage in the usual manner. Feed roll hangers 12 are pivoted at 13 to lugs 14 which project forward from the cross bar 7. These hangers support forward paper feed rollers 15 and hangers 16 are likewise pivoted as at 17 to the lugs 14 and support rear feed rollers 18. Each hanger 16 is provided with a bearing roller 19 which is adapted to engage the hanger 12 beneath it to move said hanger downwardly when the rear feed rollers are released. A spring 20 is provided for each hanger 12 and a corresponding spring 21 is provided for each hanger 16 to force the hangers and feed rollers carried thereby toward the platen. A paper apron 22 is of the usual construction and is apertured to enable the feed rollers to pass therethrough into contact with the platen or the paper thereon. Each hanger 16 is provided with a pin 23 with which a stud or projection 24 on a rock shaft 25 is adapted to engage. The rock shaft 25 is supported in forwardly extending bracket arms 26 which project forwardly from the cross bar 7. This rock shaft also receives a bearing in bearing openings in the end plates 8 of the carriage and extends beyond the left-hand end plate where it is provided with a crank arm 27. A lever 28 is pivoted at its lower end, as at 29, to the crank arm 27 and is also pivoted intermediate its ends, as at 30, to the lower end of a link 31, which latter is pivoted at its upper end to a cross rod 32. The lever 28 is extended upwardly to form a finger piece 33 by which the lever may be shifted and the rock shaft 25 controlled. It will be observed that the lever 28 and link 31 constitute in effect a toggle and that when the finger piece 33 is moved forwardly to the position indicated in Fig. 2 the toggle will assume a straight line position and the force employed to straighten the toggle is effective to turn the crank arm 27 and thus rock the shaft 25 to the position shown in Fig. 2. This movement of the shaft is effective to release the feed rollers 18 and 15 and to lock the feed rollers in their released positions.

The parts thus far described constitute a portion of the ordinary equipment of the Monarch machine and further description thereof is deemed unnecessary.

The cross bar 32, hereinbefore referred to, is the bar which ordinarily supports the paper fingers. In the present instance this bar extends through bearing openings in supporting plates 34 and 35 arranged near opposite ends of the carriage to form a support for said plates. Each supporting plate is provided with a hub 36 which extends outwardly therefrom. A pin 37 passes through openings in each hub and in the fixed cross bar 32 to fixedly connect the supporting plate to the rod. Each of the supporting plates 34 and 35 is also provided with a depending arm 38 having a recess in the rear edge thereof to form a seat for the rock shaft 25 and to provide a further support for the plates 34 and 35 by the rock shaft. These supporting plates are extended upwardly and rearwardly to provide supports for a shaft 39. The paper table 11 is cut out, as at 40, at each side edge thereof near the upper end of the table. The shaft 39 carries two pulleys or drums 41 one near each of the openings 40 and so arranged that the peripheries of the drums extend through the cut-outs 40 in the paper table and are substantially flush with the front face thereof. Each pulley has a hub 42 tapped to receive a set screw 43 by which the associated pulley may be rotatively adjusted on and fixed in its adjusted position to turn with the shaft 39. The right-hand end of the shaft 39 extends beyond the supporting plate 34 and is connected to a hand actuated device by which the shaft may be turned. This hand actuated device is designated as a whole by the reference numeral 44 which comprises a crank arm 45 provided with a finger piece 46 by which the crank may be turned. A hub 47 is formed as a part of the crank arm and is fixed to the shaft 39 by a pin 48. The crank arm is extended beyond the shaft 39 to form a second crank arm 49 bifurcated as at 50 to receive a slide 51. This slide is slotted at the sides thereof, as at 52 (see Figs. 1 and 4) to receive arms 53 formed by bifurcating the crank arm 49. This slide has a stop pin 54 projecting from the left-hand face thereof into the spiral groove 55 of a fixed guide member 56 which is formed as a part

of the right-hand supporting plate 34. From an inspection of Fig. 1 it will be seen that this spiral groove 55 makes more than one complete turn around the shaft 39. Adjacent to the left-hand face of the supporting plate 34 there is mounted a wheel 57, notched in the periphery thereof as indicated at 58. In the present instance there are twenty notches shown in the wheel 57 for purposes which will hereinafter more clearly appear. This wheel is adapted to turn freely on the shaft 39 on which it is mounted and is held against movement to the left on the shaft by a collar 59 fixed to the shaft by a pin 60. The right-hand face of the wheel 57 has a slot 61 formed therein for the reception of a slide 62, which is shown in detail in Fig. 5. As will be seen from this figure, and from Fig. 1, the slide 62 has a central longitudinal slot 63 through which the shaft 39 extends, thus affording a movement of the slide 62 radially on the wheel 57. The right-hand face of the slide 62 is provided with a stop pin 64 which extends into the spiral groove 55 in the guide 56. It will be understood that a rotative movement of the wheel 57 is effective to move the stop 64 along the spiral groove so as to effect an adjustment of the stop 64. During such adjustment the stop will move nearer to or from the center of the shaft 39 in the movement of the stop along the spiral groove, the movably mounted slide 62 enabling this movement of the stop toward and away from the center of the shaft 39 to be effected. In order to retain the wheel 57 in the position to which it has been adjusted I have provided a pawl or detent 65 pivoted at 66 on the right-hand supporting plate 34. A spring 67 is fixedly connected at one end to the pawl and bears at its other end against a pin 68 which projects inwardly from the supporting plate 34. The pawl is formed with a finger piece 69 by which the pawl may be moved against the power of its spring 67 to release the engaging nose 70 on the pawl from the notch 58 with which it engages. It will be understood, therefore, that this pawl is adapted to lock the wheel 57 and the stop 64 carried thereby in any one of the different rotative positions to which these parts may be turned. The slide 51 also enables the stop 54 carried thereby to move toward and from the shaft 39 as the stop 54 follows the spiral groove in the fixed guide 56.

Each of the pulleys 41 has connected thereto one end of a flexible feed band 71 which extends from the pulley through the associated cut out 40 in the paper table and down in front of the paper table and around the platen to a spring drum, designated as a whole by the reference numeral 72. Each band 71 in passing around the platen does not bear directly against the platen but receives a bearing on a supporting member 73 which is in the nature of a ring, the periphery of which is substantially flush with the face of the platen 10. From an inspection of Fig. 3 it will be seen that each supporting member or ring 73 receives a bearing on a metallic ring 74 which is fixed to the platen near one end thereof and is provided with a circumferential flange 75 which overlaps the outer edge of the associated ring 73 to prevent an outward displacement of the ring from the platen. The construction is such that each bearing member or ring 73 is mounted on and concentrically with the platen and is free to rotate independently of the platen. It will be understood that in the passage of each band 71 from its pulley 41 to its spring drum 72 the band partly surrounds and is adapted to bear against the associated bearing member or ring 73 and does not contact with the face of the platen although the platen forms a support for the rings and bands, for purposes which will hereinafter more clearly appear. Each band 71 is connected at its forward end to the associate spring drum 72 as indicated at 76 in Fig. 6. Each drum 72 is flanged as at 77 to insure a guidance of the associated band on the drum as it is reeled on and off the same. The drums 72 are supported for rotation on a fixed rod 78 fixedly supported in the plates 34 and 35, the axis of this rod being parallel with the axis of the platen and the two axes being apart a distance greater than one-half the diameter of the platen, lock nuts 79 being employed to secure the rod against turning movement. Each drum is provided with a hub 80 which abuts at its outer end against the associated supporting plate 34 or 35 as will be understood upon reference to Fig. 7. Inward displacement of each drum 72 is prevented by a collar 80^a fixedly connected to the rod 78 by a pin 80^b. A coiled spring 81 is contained within each drum and is secured at its outer end, as at 82, to its drum 72. The inner end of each spring is secured to a pin 83 which extends through an opening in the rod 78 and through corresponding openings in a sleeve 84. The inner end of each spring 81 is therefore fixed to the rod 78, whereas the outer end of each spring is connected to its drum to turn the same in the direction of the arrow *a* in Fig. 2. It will be understood, therefore, that the power of the springs 81 is exerted to move the flexible bands 71 longitudinally in one direction and to uncoil the bands from the pulleys or drums 41. In order to restrain the action of these springs and prevent a forward movement of the band 71, I have provided a ratchet wheel 85 on the shaft 39 near the left-hand end thereof. A detent 86 coöperates with this ratchet wheel to prevent it from turning in the direction of the arrow *b* in Fig. 2 and to hold

the shaft 39 and the bands 71 against movement under the power of the springs 81. This detent 86 is pivoted on a shouldered screw 87 which is received at its threaded end in a tapped opening in the supporting plate 35. The detent 86 is extended forwardly to form a finger piece 88 with which a leaf spring 89 coöperates to maintain the detent normally in engagement with its ratchet wheel 85. The spring 89 bears at its free end upwardly against the under side of the finger piece and is fixed at its opposite end, as at 90, to the supporting plate 35. An arm 91 is extended downwardly and rearwardly beyond the pivot of the detent and is so constructed that on the depression of the finger piece 88, to release the detent, this arm 91 will be brought into contact with the teeth of the ratchet wheel 85 and will act as a brake to prevent too rapid a movement of the feed bands 71 under the action of their springs 81.

It will be understood that a movement of the finger piece 46 from the position shown in Fig. 1 until it is arrested by the coöperation of the stops 54 and 64, is effective to turn the shaft 39 in a direction opposite to that indicated by the arrow *b* in Fig. 2, thereby winding the bands on the drums 41 and turning the spring drums 72 against the power of their springs and thus effecting a rearward movement of the bands 71 independently of the platen. A forward movement of the bands is effected by depressing the finger piece 88 to release the detent 86, thereby enabling the springs 81 to become effective to move the bands forwardly independently of the platen and to wind the forward ends of the bands on the drums 72.

In order to limit the forward movement of the bands on the drums 72 under the action of the springs 81, I have provided stop devices which coöperate with the drums. In the present instance these stop devices are in the nature of Geneva stops. Thus the hub 80 on each spring drum 72 is provided with a single tooth 92 (Figs. 2 and 7) which is adapted to engage a mutilated toothed wheel or disk 93 mounted on a shouldered pivot screw 94 against the inner face of its associated supporting plate 34 or 35 with sufficient frictional resistance to prevent the disk or toothed wheel 93 from rotating too freely. The effect of this Geneva stop construction is to check the return movements of the drums and bands under the action of the springs 81 and arrest these parts as shown in Fig. 2 after a predetermined extent of forward movement has been transmitted to the bands from the rearmost position to which they have been moved by the hand actuated device 44. When the parts are in the positions shown in Fig. 2 the springs 81 do not exert any power on the bands 71.

I have provided a side edge gage for the invoice sheets near the left-hand end of the platen. This gage is represented by the reference numeral 95 and is in the nature of a flat plate, the right-hand contact face of which extends in a plane at right angles to the axis of the platen. This plate is mounted on the inner end of a supporting rod 96 which extends through an opening in the left-hand supporting plate 35 and through a hub 97 carried thereby. A set screw 98 is received in a tapped opening in this hub and bears at its inner end against the supporting rod 96 to retain it in the position to which it may be adjusted longitudinally in the hub 97. The gage may thus be adjusted longitudinally of the platen and held by the set screw 98 in its adjusted position.

In the present instance I have so constructed the mechanism that the bands 71 are normally sufficiently slack that they act in the nature of guides for directing the work sheets around the platen as the latter is rotated by the usual line spacing mechanism at the left-hand end of the platen and which is shown in Fig. 3, or by the usual finger wheels connected to the ends of the platen shaft. Therefore the bands 71, during the normal operation of the machine, merely act as guide bands which partly surround the platen and are ineffective at this time to feed a work sheet independently of the platen. However, I have provided means for automatically taking up the slack in the bands when the feed rollers are released so as to tension the bands and cause them to exert sufficient force against the bearing rings 73 to enable the bands to coöperate with the bearing rings to effect a feed of the work sheet independently of the platen. This means in the present instance comprises a crank arm 99 fixed on the rock shaft 25 in the rear of each of the bands 71. Each of these crank arms carried a roller 100 which is adapted to bear against the rear face of the band, as represented in Fig. 2. When the feed rollers 15 and 18 are in contact with the platen, as represented in Fig. 1, the arms 99 will be maintained by the rock shaft in the position shown where the rollers 100 are out of contact with the bands 71 so that at this time there is sufficient slack in the bands to enable them merely to act as guides for a work sheet which passes between them and the supporting rings 73. When, however, the rock shaft 25 is turned to the position shown in Fig. 2, to release the feed rollers 15 and 18, the arms 99 are moved forwardly, thereby bringing the rollers 100 thereon into contact with the bands 71 and flexing the bands at the point of contact therewith so as to automatically take up the slack in the bands and tension them against the bearing rings 73. At this time a movement of the bands is ef-

fective to clamp a work sheet between the bands and the rings 73 with sufficient pressure to effect a feed of a work sheet independently of the platen when the bands are moved longitudinally.

As hereinbefore indicated the line spacing mechanism is of the usual construction and only a brief reference thereto will be made. From an inspection of Fig. 3 it will be seen that the line spacing handle 101 actuates a line spacing pawl 102 in the usual manner to effect an engagement thereof with the teeth 103 of the line spacing wheel and to cause said wheel to be intermittently rotated to turn the platen for line spacing.

Having described the construction I will now proceed to describe one method of operating the mechanism for condensed record billing work.

In effect the outer end 55^a of the spiral slot constitutes a fixed stop with which the movable stop 54 coöperates, whereas the stop 64 constitutes an adjustable stop with which the movable stop 54 co-acts. When it is desired to set the stops for billing work the adjustable stop 64 is preferably brought to the inner end 55^b of the spiral slot. The blank invoice is then fed around the platen from the rear with the feed rollers 15 and 18 in their active positions. When the invoice is in a position to receive the first line of writing the operator grasps the rear edge of the invoice with one hand while the crank 44 is turned with the other hand from its normal position shown in Fig. 1. When the invoice is free of the bands the cranking movement is stopped and the detent 86 will hold the parts in the positions to which they have been moved. The operator now releases the detent 65 to free the disk or wheel 57, which latter is then turned in the direction of the arrow *c* in Fig. 1 until the stop pin 64 is shifted to a position where it abuts the stop 54 which was previously set by the actuation of the crank 44. The detent 65 is then allowed to engage the adjacent slot 58 in the wheel or disk 57 to lock the latter against movement and to maintain the stop 64 fixed in the position to which it has been adjusted. The operator now depresses the finger piece 88, thus allowing the springs 81 to draw the bands around the platen and on to the drums 72 until the movement of the latter is arrested by the Geneva stop devices. The stop devices thus set need not be again adjusted until bill heads having headings of a different size are to be employed. The first invoice, record sheet and interposed carbon may next be introduced into the machine in the usual manner, giving the invoice sheet a sufficient "lead" to bring the first item to be copied on the record sheet near the top thereof. The introduction of the invoice, carbon and record sheets in the first instance may be effected by turning the platen to the desired position to bring the invoice sheet to a position to receive the first line of writing. At this time, of course, the feed rollers are operative and there is sufficient slack in the bands 71 to enable the sheets to be fed around with the platen between the bands and the supporting rings 73 while the bands remain at rest. The operator proceeds to write the invoice and after the last item has been written thereon one or more line spacing movements may be given to the platen to provide a space upon the record sheet between the copy of the last line of the written invoice and the first line of the copy of the next invoice to be written. The feed rollers are then released sufficiently to permit the invoice and carbon inlay to be removed from the front of the platen without, however, effecting sufficient movement of the crank arms 99 to tension the feed bands 71. After the printed invoice and carbon inlay have been removed the feed rollers are thrown and locked off, which movement automatically takes up the slack in the bands. The crank 44 is then turned in a direction opposite to that indicated by the arrow *c* in Fig. 1 which results in moving the record sheet rearwardly over the face of the platen, while the latter remains at rest, until the stop 54 reaches the adjustable stop 64 which results in arresting the movement of the crank. A new invoice sheet and a carbon inlay are now introduced at the rear of the platen between the record sheet and the left-hand band 71 with the left-hand edge of the invoice sheet against the side edge gage 95. The finger piece 88 is then depressed to release the detent 86 and enable the springs 81 to move the bands 71, thereby feeding the record sheet and newly introduced invoice and carbon inlay to a position where the first line of writing may be produced on the invoice sheet. The copy of this line will appear one or two line spaces from the last line of the previously copied invoice on the record sheet. After the second invoice has been printed it may be removed and the record sheet may again be moved rearwardly by the crank 44 to a position to properly receive a newly introduced invoice and carbon inlay as previously described. These operations may be repeated indefinitely until the record sheet is filled when a new record sheet, invoice and carbon inlay may be introduced in the manner previously set forth.

From the foregoing description it will be understood that after the parts are once "set" it is merely necessary to turn the crank 44 in order to return the record sheet to a position where a new invoice and the carbon inlay may be introduced into the machine and properly located with reference to the record sheet. This movement of the record sheet, of course, is effected independ-

ently of the movement of the platen. A forward movement of the invoice, record and carbon inlay sheets to a position where the invoice is so situated as to receive the first line of writing is effected merely by depressing the finger piece 88 and the forward feed of the sheets is effected independently of the movement of the platen.

It will be seen that the bands 71 when tensioned by the arms 99 are effective to effective hold the condensed record sheet at any position to which it may be moved, and while the ordinary paper feeding devices are entirely out of contact therewith. Thus even when the sheet is backed up to a position where the leading edge thereof is back of the rear feed rollers 18 the bands will still maintain a clamping engagement on the record sheet. This construction, therefore, is particularly effective since in any condition of use the record sheet is firmly held by the bands 71 during the backing of the record sheet and there is no liability of the record sheet being accidentally shifted or displaced from the position to which it is intended it shall be moved. A result of any such shifting would be to destroy the order of alinement of the transfer record. This advantage is found to be a distinct one over prior constructions in which the invoice sheet under certain conditions is not effectively held when the feed rollers are released.

If desired, any suitable means may be employed intermediate the ends of the platen to prevent a bulge in the center of the sheets. Thus a third band may be adjusted at the center, said bands being narrowed down substantially to letter space dimensions and with a very light spring drum connected therewith without, however, an actuating connection being effected between the shaft 39 and said third band. This band would be adjusted to a position between columns and would co-act directly with the platen, exerting a light pressure thereon, the sole function being merely to prevent a bulge at the center of a very wide sheet and having no function as a feeding device to assist in feeding a work sheet independently of the platen.

The above and other changes may be made without departing from the spirit and scope of my invention and some of the devices shown described may be employed without others.

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

1. In a typewriting machine, the combination of a rotative platen, line-spacing means for effecting a feed of the paper by a rotative movement of the platen, and power driven means for feeding a work sheet forward a predetermined distance across the surface of the platen and at right angles to the printing line, said line spacing means being operative to impart line space movements to said work sheet after it has been fed forward by the power-driven means.

2. In a typewriting machine, the combination of a rotative platen, and power driven means disconnected from but co-acting directly with a work sheet for feeding it a predetermined distance around and relatively to the platen, said power-driven means comprising two sheet-moving devices between which the sheet extends and one of which is movable by the immediate action of the other on the sheet alone.

3. In a typewriting machine, the combination of a rotative platen, and power driven means for effecting a forward feed of a work sheet around and relatively to the platen, said power-driven means comprising independently supported outer and inner sheet moving devices between which the sheet passes, the outer device being power-driven to transmit motion to the sheet and inner device.

4. In a typewriting machine, the combination of a platen, line spacing mechanism, independent spring actuated means for feeding a work sheet a predetermined distance in one direction across the surface of the platen, and hand actuated means for feeding said work sheet a predetermined distance in the opposite direction across the surface of the platen, said line spacing mechanism being effective to space lines written on the work sheet after it has been fed to the predetermined position in the machine.

5. In a typewriting machine, the combination of a rotative platen; and means for effecting a forward and backward feed of a work sheet a predetermined distance around and relatively to said platen, said means including two independently supported sheet-moving devices between which the sheet extends and a spring by which one of these devices is movable to transmit motion through the work sheet to the other.

6. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and independent means for effecting a backward and forward feed of a work sheet independently of the platen, said means including spring controlled means for feeding a work sheet in one direction for a predetermined distance around and independently of said platen, a detent for restraining the action of said spring on the feeding means, and a hand actuated device for releasing said spring to render it effective on the feeding means.

7. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and independent means for effecting a forward and backward feed of a work sheet a predetermined distance around and relatively to said platen, said means in-

cluding a spring for feeding the work sheet in one direction, hand actuated means for feeding the work sheet in the opposite direction and for simultaneously placing said spring under tension, a detent for restraining the action of said spring, and a hand actuated device for releasing said detent to render said spring effective to feed the work sheet.

8. In a typewriting machine, the combination of a platen; and means separate and distinct from the platen for feeding a work sheet across the surface of the platen, said means comprising a rotary device and a band which act on both faces of the sheet, the rotary device and sheet being movable by the immediate action of the band on the sheet alone.

9. In a typewriting machine, the combination of a rotative platen; line spacing mechanism for effecting a step-by-step line spacing movement of the platen; and means separate and distinct from the platen for feeding a work sheet around and relatively to said platen, said means comprising a band which is disconnected from but co-acts directly with the work sheet and which is attached at its ends to supports that are independent of the platen and platen shaft.

10. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and said line spacing mechanism for feeding a work sheet around and relatively to said platen, said means comprising a band which is disconnected from but co-acts directly with the work sheet, and power operated means connected to said band for moving it, said line spacing mechanism being operative to impart line space movements to said work sheet after it has been fed forward a predetermined distance by the means which comprises said band.

11. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and said line spacing mechanism for feeding a work sheet around and relatively to said platen, said means comprising a band which co-acts directly with the work sheet, a spring connected to one end of said band, and a rotary device between which and the band the work sheet extends and which is movable by the immediate action of the band on the work sheet alone.

12. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and said line spacing mechanism for feeding a work sheet around and relatively to said platen, said means comprising a band which is disconnected from but co-acts directly with the work sheet, a spring connected to said band, a detent for restraining said spring, and means for releasing said detent to render the spring effective to move the band.

13. In a typewriting machine, the combination of a rotative platen, line spacing mechanism, and independent power-driven means disconnected from but coöperative with a work sheet for feeding it forward a predetermined distance across the surface of the platen, said power-driven means comprising a device mounted on an axis that is parallel to the axis of the platen, the distance between said two axes being greater than one half the diameter of the platen.

14. In a typewriting machine, the combination of a rotative platen, line spacing mechanism, and independent power driven means disconnected from but coöperative with a work sheet for feeding it forward a predetermined distance across the surface of the platen, said power-driven means comprising a drum mounted on an axis parallel to the axis of the platen, and a band attached at one end to said drum, the distance between said two axes being greater than one half the diameter of the platen.

15. In a typewriting machine, the combination of a rotative platen; and means for effecting a forward and backward feed of a work sheet a predetermined distance around and relatively to said platen, said means including a spring for feeding the work sheet in one direction, hand actuated means for feeding the work sheet in the opposite direction and for simultaneously placing said spring under tension, a detent for restraining the action of said spring, a hand actuated device for releasing said detent to render said spring effective to feed the work sheet, and stop devices for limiting the forward and backward feed of the work sheet.

16. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and said line spacing mechanism for feeding a work sheet across the surface of the platen, said means comprising a band which is disconnected from but co-acts directly with the work sheet to feed it relatively to the platen; and rotary devices to which the band is connected at its ends and which have two axes of rotation that are parallel to the axis of the platen, each of said two axes of rotation being in a different plane from that which contains the other and the axis of the platen.

17. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and its line spacing mechanism for feeding a work sheet around and relatively to said platen, said means comprising a band which co-acts with the work sheet, a spring connected to one end of said band, hand actuated means connected to the

other end of said band, stop devices for limiting the movement of said band under the action of the springs, and stop devices for limiting the movement of the band under control of said hand actuated device.

18. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means separate and distinct from the platen and said line spacing mechanism for feeding a work sheet around and relatively to said platen, said means comprising a band which co-acts with the work sheet, a spring connected to one end of said band, hand actuated means connected to the other end of said band, stop devices for limiting the movement of said band under the action of the spring, stop devices for limiting the movement of the band under control of said hand actuated device, and means for affording an adjustment of certain of said last mentioned stop devices.

19. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting member mounted concentrically with the platen and movable independently thereof and against which a work sheet is adapted to bear, and a movable band which is unattached to said supporting member and transmits motion to it through the work sheet.

20. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting member having a diameter substantially co-extensive with that of the platen and against which the work sheet bears, said supporting member being movable with the work sheet and independently of the platen, and a movable band which partly surrounds and is unattached to said member and transmits motion to it through the work sheet.

21. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting ring which surrounds the platen but which is movable independently thereof and against which the work sheet is adapted to bear, and a movable band which is unattached to and passes partly around said ring and transmits motion to it through the work sheet.

22. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising two supporting rings one at each end of the platen, each of said rings surrounding the platen and being movable independently thereof and against which the work sheet is adapted to bear, and a movable band associated with each ring and partly surrounding it and coöperative with the ring to feed an interposed work sheet.

23. In a typewriting machine, the combination of a rotary device; and means, comprising a power-actuated work sheet engaging band, for feeding a work sheet, the band having supports at its ends and the rotary device having a separate support, and the band being operative between its ends on the work sheet to transmit motion through it to the rotary device.

24. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet independently thereof, said means comprising a work sheet engaging band and coöperative device which act on the sheet interposed between them, the band having supports at its ends and said coöperative device having a separate support, and the band being connected at each end with means for imparting motion to the band.

25. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet independently thereof, said means comprising a work sheet engaging band which partly surrounds and is movable independently of the platen, and means for moving said band independently of the platen, the last-mentioned means including two devices to which said band is connected at its ends and which are mounted on two shafts that are parallel to the platen-shaft.

26. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet independently thereof, said means comprising a work sheet engaging band which passes around and is supported by the platen for movement independently thereof, a hand actuated device connected to one end of the band for moving it in one direction, a spring connected to the other end of the band for moving it in the opposite direction, stop devices for limiting the movement of said hand actuated device, and means for limiting the movement of the band under the action of said spring.

27. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting ring which surrounds the platen but which is movable independently thereof and against which the work sheet is adapted to bear, a movable band which passes around said ring and coöperates therewith to feed the work sheet independently of the platen, a hand actuated device connected to one end of said band for moving it in one direction, a spring connected to the other end of said band for moving it in the opposite direction, stop devices for limiting the movement of the band under control of said hand actuated device, and stop devices for limiting

the movement of the band under control of said spring.

28. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising two supporting rings one at each end of the platen, each of said rings surrounding the platen and being movable independently thereof and against which the work sheet is adapted to bear, movable means coöperating with each ring to effect a feed of the work sheet, and means for giving a predetermined extent of backward and forward movement to said movable means.

29. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising two supporting rings one at each end of the platen, each of said rings surrounding the platen and being movable independently thereof and against which the work sheet is adapted to bear, a movable band associated with each ring and partly surrounding it and coöperative with the ring to feed an interposed work sheet, and means for simultaneously giving a predetermined extent of backward or forward feed to both of said bands.

30. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising two supporting rings one at each end of the platen, each of said rings surrounding the platen and being movable independently thereof and against which the work sheet is adapted to bear, a movable band associated with each ring and partly surrounding it and coöperative with the ring to feed an interposed work sheet, a hand actuated device connected to one end of each band to simultaneously move the bands in one direction, and a spring connected to the opposite end of each band to simultaneously move the bands in the opposite direction.

31. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising two supporting rings one at each end of the platen, each of said rings surrounding the platen and being movable independently thereof and against which the work sheet is adapted to bear, a movable band associated with each ring and partly surrounding it and coöperative with the ring to feed an interposed work sheet, a hand actuated device connected to one end of each band to simultaneously move the bands in one direction, a spring connected to the opposite end of each band to simultaneously move the bands in the opposite direction, and stop devices for limiting the backward and forward movements of said bands under control of said hand actuated device and spring.

32. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting member having a contact surface substantially flush with the surface of the platen and against which a work sheet is adapted to bear, said member being movable independently of the platen, a movable band which passes around said supporting member and coöperates therewith to feed an interposed work sheet independently of the platen, and means for giving a predetermined extent of backward and forward feed to said band.

33. In a typewriting machine, the combination of a rotative platen; and means for feeding a work sheet around and relatively to said platen, said means comprising a supporting member having a contact surface substantially flush with the surface of the platen and against which a work sheet is adapted to bear, said member being movable independently of the platen, a movable band which passes around said supporting member and coöperates therewith to feed an interposed work sheet independently of the platen, means for effecting a backward and forward movement of said band, and stop devices for limiting the movements of said moving means.

34. In a typewriting machine, the combination of a rotative device, a feed band which coöperates with said rotative device to feed an interposed work sheet, and means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them.

35. In a typewriting machine, the combination of a rotative device, a feed band which coöperates with said rotative device to feed an interposed work sheet, means connected to said band for effecting a longitudinal movement thereof, and means cooperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them.

36. In a typewriting machine, the combination of a rotative platen, a rotative device, a feed band which coöperates with said rotative device to feed an interposed work sheet, means independent of the platen for effecting a longitudinal movement of said band, and means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed

a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them.

37. In a typewriting machine, the combination of a rotative device, a feed band which coöperates with said rotative device to feed an interposed work sheet, means connected to said band for effecting a longitudinal movement thereof, means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them, and means for limiting the movement of said band moving means.

38. In a typewriting machine, the combination of a rotative platen, a rotative device adapted to rotate independently of the platen, a feed band which co-acts with said rotative device to feed a work sheet relatively to the platen, and means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them.

39. In a typewriting machine, the combination of a rotative platen, a rotative device adapted to rotate independently of the platen, a feed band which co-acts with said rotative device to feed a work sheet relatively to the platen, means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them, and means independent of the platen for giving a predetermined extent of movement to said band.

40. In a typewriting machine, the combination of a rotative platen, a rotative device adapted to rotate independently of the platen, a feed band which co-acts with said rotative device to feed a work sheet relatively to the platen, means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them, means for moving said band, and stop devices for limiting the movement of said band moving means.

41. In a typewriting machine, the combination of a rotative platen, a rotative device adapted to rotate independently of the platen, a feed band which co-acts with said rotative device to feed a work sheet relatively to the platen, means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them, a hand actuated device connected to one end of said band for moving the band in one direction, and a spring connected to the other end of the band for moving the band in the opposite direction.

42. In a typewriting machine, the combination of a rotative platen, a rotative device adapted to rotate independently of the platen, a feed band which co-acts with said rotative device to feed a work sheet relatively to the platen, means coöperative with said band to slacken it on said rotative device and thereby render the band ineffective to feed a work sheet or to tighten the band on said rotative device and thereby render the band and rotative device effective to feed a work sheet between them, a hand actuated device connected to one end of said band for moving the band in one direction, a spring connected to the other end of the band for moving the band in the opposite direction, and stop devices for limiting the backward and forward movements of said band under the control of said hand actuated device and spring.

43. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to the platen, said means comprising a normally ineffective feed band; means for releasing the feed rollers; and automatically operating means for putting the feed band in condition to engage a work sheet when the feed rollers are released.

44. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to the platen, said means comprising a feed band; means for releasing the feed rollers; and automatically operating means for tightening said band and thereby rendering it effective when the feed rollers are released and for rendering the band slack and ineffective when the feed rollers move to operative position.

45. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to the platen, said means comprising a normally ineffective feed band, and means independent of the platen for moving said feed band longitudinally; means for releasing the feed rollers; and automatically operating means for putting the feed-band in condition to engage a work sheet when the feed rollers are released.

46. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to

the platen, said means comprising a normally ineffective feed band, a hand actuated device connected to one end of said band for moving it in one direction, and a spring for moving said band in the opposite direction; means for releasing the feed rollers; and automatically operating means for putting the feed-band in condition to engage a work sheet when the feed rollers are released.

47. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to the platen, said means comprising a feed band, and means for effecting a backward and forward movement of the band a predetermined distance; means for releasing the feed rollers; and automatically operating means for tightening said band and thereby rendering it effective when the feed rollers are released and for rendering the band slack and ineffective when the feed rollers move to operative position.

48. In a typewriting machine, the combination of a rotative platen; feed rollers; means for moving a work sheet relatively to the platen, said means comprising a feed band, a spring operatively connected to said band to move it in one direction, a detent for restraining the action of said spring, and means for releasing said detent; means for releasing the feed rollers; and automatically operating means for rendering the feed band operative when the feed rollers are released.

49. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means independent of the platen and said line spacing means for effecting a movement of the work sheet, said means comprising a movable device disconnected from but coöperative directly with the work sheet to move it, a spring connected to said movable device to move it, a detent for restraining the action of the spring on said movable device, and means for releasing said detent.

50. In a typewriting machine, the combination of a rotative platen; and means for effecting a movement of the work sheet, said means comprising a movable device coöperative with the work sheet to move it, a spring connected to said movable device to move it, a detent for restraining the action of the spring on said movable device, and means for releasing said detent and for simultaneously applying a brake to retard the movement of said movable device under the action of said spring.

51. In a typewriting machine, the combination of a rotative platen; and means for effecting a movement of the work sheet, said means comprising a movable device coöperative with the work sheet to move it, a spring connected to said movable device to move it, a detent for restraining the action of the spring on said movable device, a ratchet wheel which is engaged by said detent, a braking member carried by said detent, and means for releasing said detent and applying said braking member to retard the movement of said movable device under the action of said spring.

52. In a typewriting machine, the combination of a rotative platen; line spacing mechanism; and means independent of the platen and said line spacing mechanism for effecting a movement of the work sheet, said means comprising a longitudinally movable band disconnected from but coöperative directly with the work sheet to move it, a spring connected to said band to move it, a detent for restraining the action of the spring on said band, and means for releasing said detent.

53. In a typewriting machine, the combination of a rotative platen; and means for effecting a movement of the work sheet, said means comprising a longitudinally movable band coöperative with the work sheet to move it, a spring connected to said band to move it, a detent for restraining the action of the spring on said band, and means for releasing said detent and for simultaneously applying a brake to retard the movement of said band under the action of said spring.

54. In a typewriting machine, the combination of a rotative platen; and means for effecting a movement of the work sheet, said means comprising a longitudinally movable band coöperative with the work sheet to move it, a spring connected to said band to move it, a detent for restraining the action of the spring on said band, a ratchet wheel which is engaged by said detent, a braking member carried by said detent, and means for releasing said detent and applying said braking member to retard the movement of said band under the action of said spring.

55. In a typewriting machine, the combination of a platen; and means for effecting a predetermined extent of feed of a work sheet independently of the platen, said means comprising a hand actuated device by which movement is transmitted to the work sheet, a stop carried by said hand actuated device, a spiral guide in which said stop works, and a coöperative adjustable stop.

56. In a typewriting machine, the combination of a platen; and means for effecting a predetermined extent of feed of a work sheet independently of the platen, said means comprising movable means which are adapted to engage a work sheet and move the same independently of the platen, a hand actuated device by which movement is transmitted to said movable means, a stop carried by said hand actuated device, a spiral guide in which said stop works, and a coöperative adjustable stop.

57. In a typewriting machine, the combination of a platen; and means for effecting a predetermined extent of feed of a work sheet independently of the platen, said means comprising a rotative hand actuated device by which movement is transmitted to the work sheet, a stop carried by said hand actuated device, a spiral guide in which said stop works and is adapted to travel throughout more than a single revolution with the hand actuated device, and a cooperative adjustable stop.

58. In a typewriting machine, the combination of a platen; and means for effecting a predetermined extent of feed of a work sheet, said means comprising a hand actuated device, a slide carried by said hand actuated device, a stop carried by said slide, a spiral guide in which said stop works, a rotatively adjustable carrier, a second slide carried by said carrier, and a second stop carried by said second slide and coöperative with the first mentioned stop.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 1st day of April A. D. 1913.

HERBERT H. STEELE.

Witnesses:
BESSIE G. KETTELL,
H. BARRY.