A. W. SMITH.

TYPE WRITING MACHINE.

APPLICATION FILED DEC. 4, 1905.

977,480.

Patented Dec. 6, 1910.

4 SHEETS—SHEET 1.

FIG. 1.

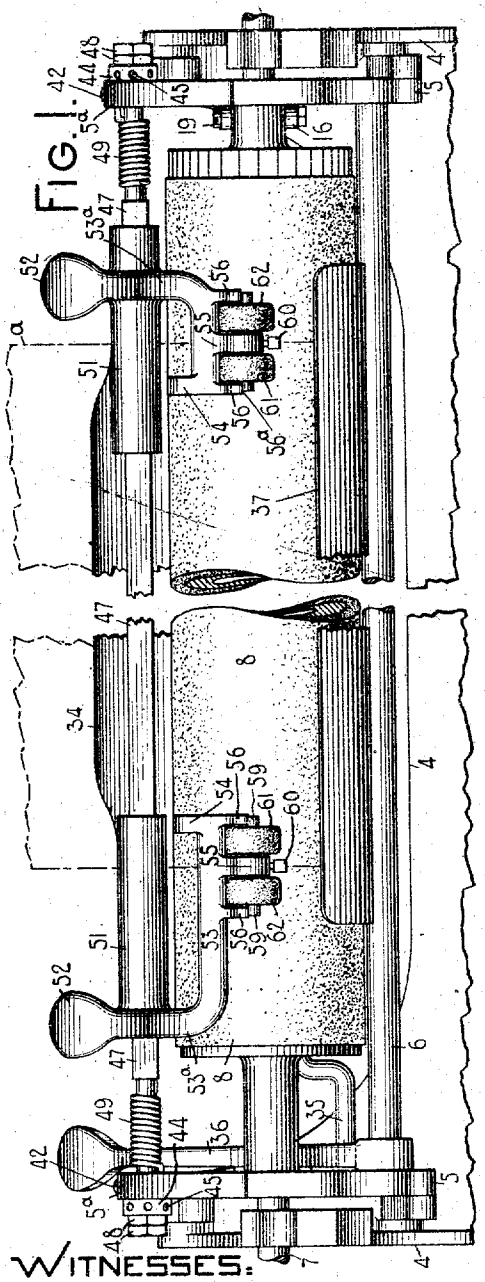
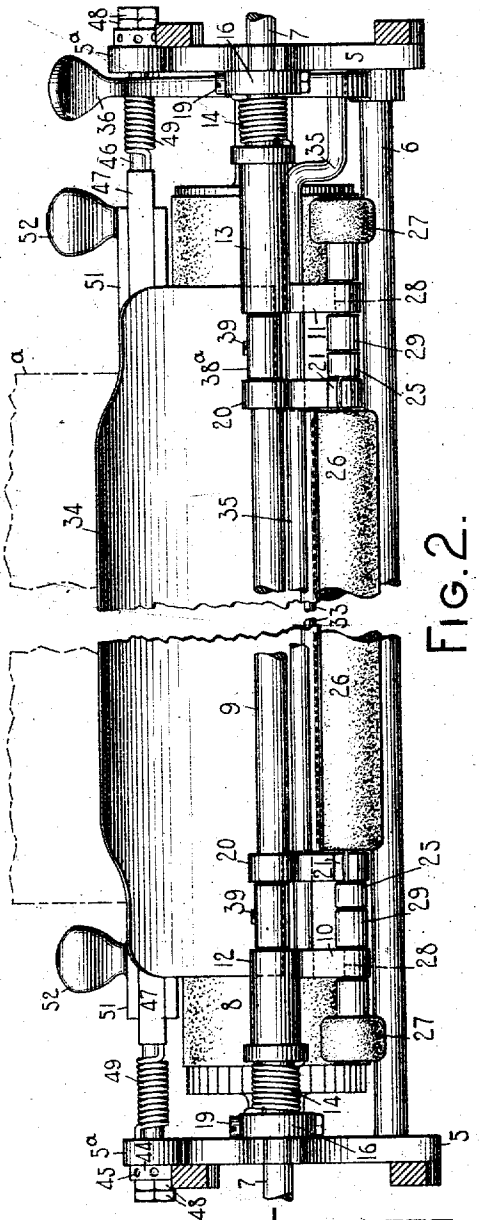


FIG. 2.



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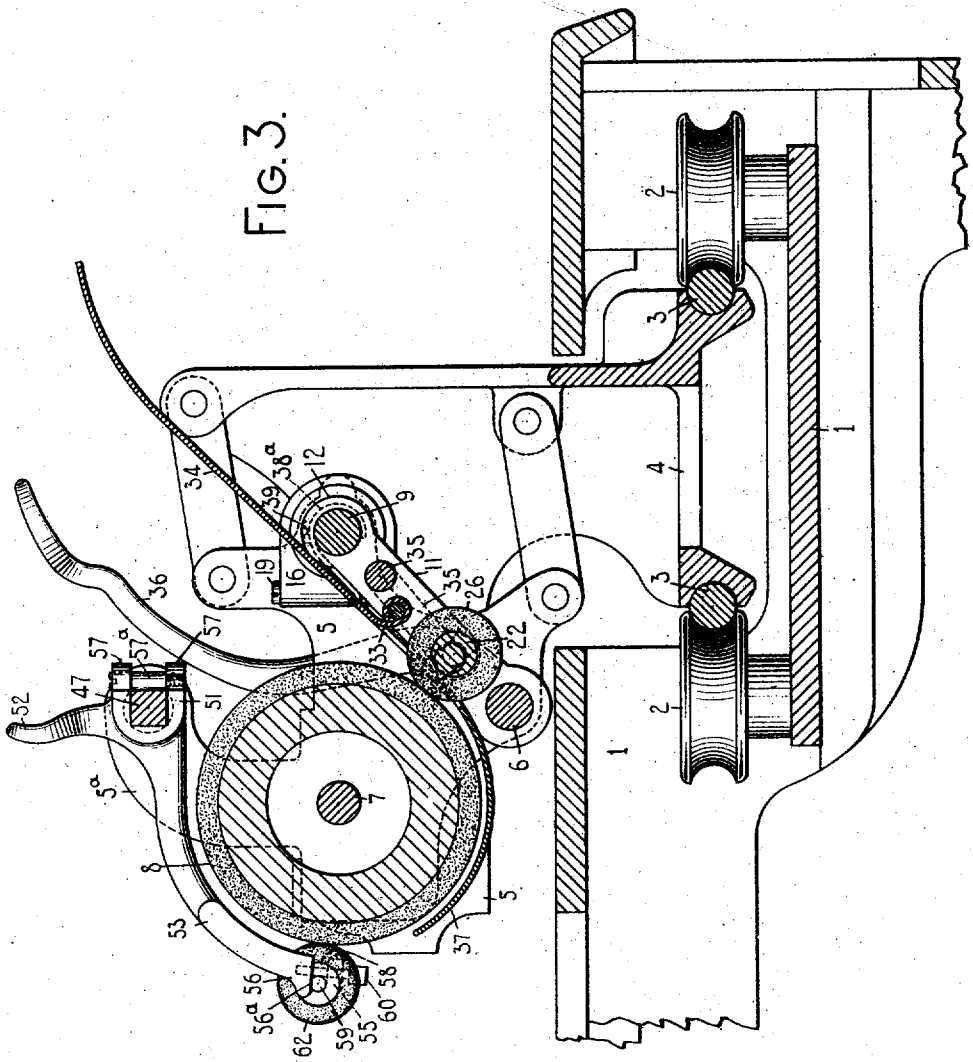
4 SHEETS—SHEET 2.

FIG. 3.



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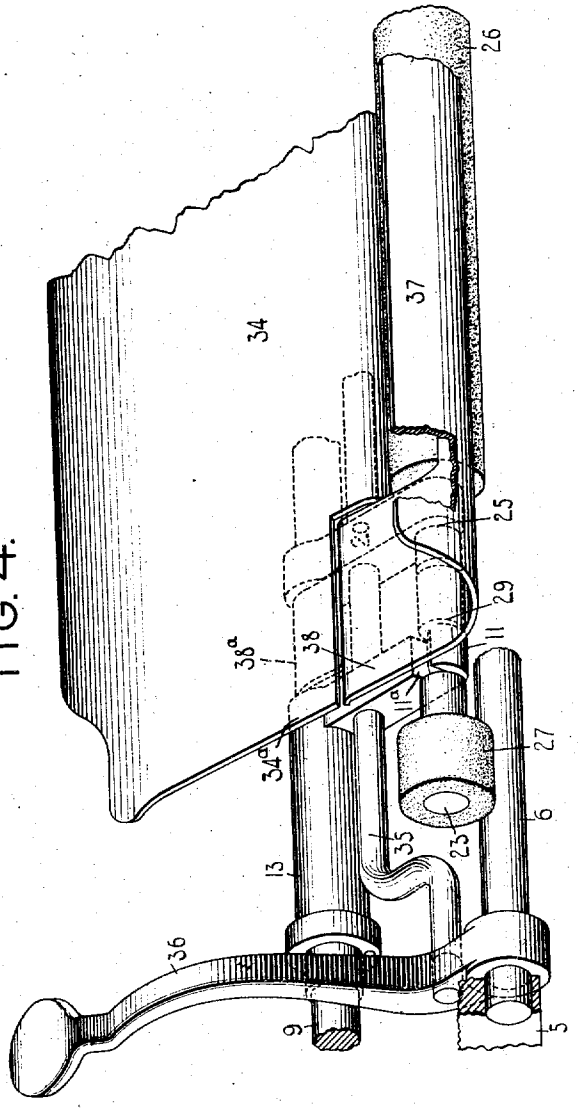
4 SHEETS—SHEET 3.

FIG. 4.



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4 SHEETS—SHEET 4.

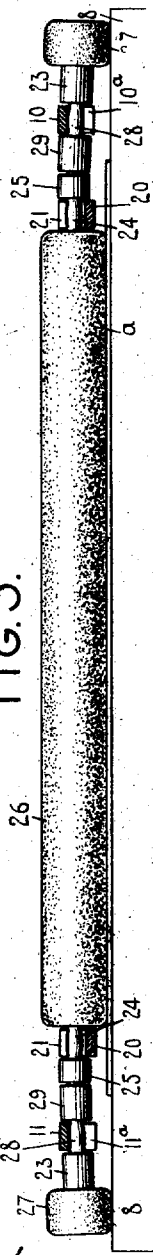

FIG. 5.

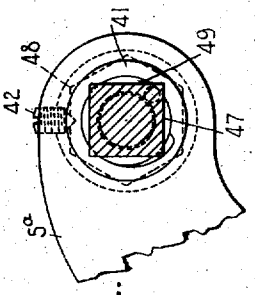

FIG. 12.

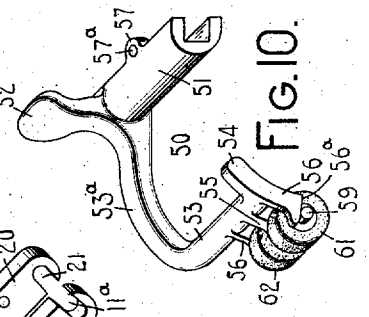

FIG. 10.

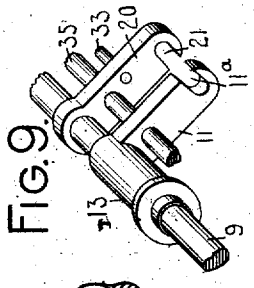

FIG. 9.

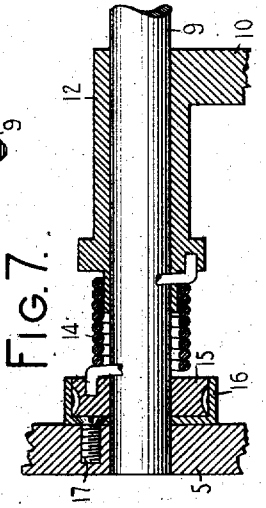

FIG. 7.

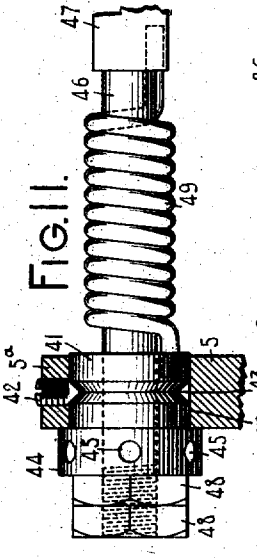

FIG. 11.

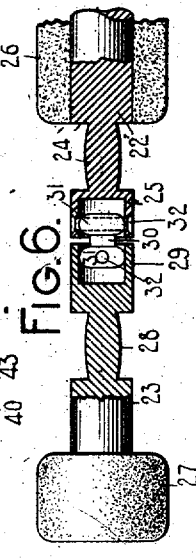

FIG. 6.

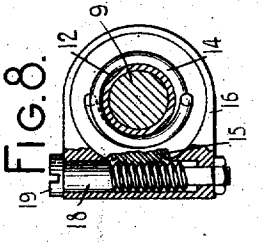

FIG. 8.

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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

977,480. Specification of Letters Patent. Patented Dec. 6, 1910.

Application filed December 4, 1905. Serial No. 290,169.

To all whom it may concern:

Be it known that I, ARTHUR W. SMITH, a citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York 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 the paper feeding mechanism of typewriting machines and has for its main object to provide improved devices for feeding, guiding and controlling the paper.

To the above and other ends the invention resides in the features of construction, combinations of devices, and arrangements of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a fragmentary front elevation of a platen and platen carrier and showing my invention in connection therewith, parts of the machine being omitted. Fig. 2 is a fragmentary rear elevation of the parts shown in Fig. 1. Fig. 3 is an enlarged vertical front to rear sectional view of the platen, platen carriage and carriage bearings and embodying my invention. Fig. 4 is an enlarged fragmentary perspective view of part of my improved paper feeding mechanism. Fig. 5 is an enlarged detail plan view of the main feed roller and illustrating the manner in which said feed roller coöperates with the platen. Fig. 6 is an enlarged fragmentary detail longitudinal sectional view of the main feed roller. Figs. 7 and 8 are enlarged detail longitudinal and transverse sectional views respectively of the means for varying the spring tension of the main feed roller. Fig. 9 is an enlarged detail perspective view of part of the supporting means of the main feed roller. Fig. 10 is a detail perspective view of one of the paper fingers. Figs. 11 and 12 are enlarged detail side and end elevations respectively of the means for varying the spring tension applied to the paper fingers.

In the drawings I have shown my improved paper feeding mechanism applied to the platen and platen carrier of a front-strike typewriting machine, but I desire it to be understood that my invention may be adapted to other forms of writing machines than that illustrated.

Referring more especially to Fig. 3, 1 indicates the framework of the machine supporting rollers 2 which coöperate with rods 3 secured to a carriage truck 4 in which is mounted a platen frame or carrier comprising side portions 5 connected by a cross rod 6. A platen axle 7 is journaled in the side portions 5 and a cylindrical rotary platen 8 is mounted on said axle.

Journaled in the side portions 5 of the platen frame or carrier at the rear of the platen and about opposite its center is a rod 9 mounted upon which near its ends are depending hangers or arms 10 and 11 having hub portions 12 and 13 respectively (Fig. 2) which surround the rod 9. Coiled springs 14 surround the rod 9 outside the hub portions 12 and 13, each of said coiled springs having one end secured in one of the hub portions and the other end secured in a worm wheel 15 (Fig. 7), said worm wheel being journaled on the rod 9 and contained within a case 16 secured by screws 17 to the adjacent side portion or bar 5 of the platen carrier. As best appears in Fig. 8, a worm 18 having a screw head 19 is journaled in each case 16 and coöperates with the teeth of the worm wheel 15. It will be understood that when said worm is turned by a tool properly applied to the head 19, the worm wheel 15 is turned to increase or decrease the tension of its associate coiled spring 14, thereby increasing or decreasing the spring pressure applied to the associate arm or hanger 10 or 11. Two additional arms or links 20 (Figs. 2 and 9) are loosely mounted upon the rod 9 between the arms 10 and 11, one of said arms 20 being adjacent to each of said first described arms. The arms 20 depend from the rod 9 and are provided at their lower ends with slots 21, as appears clearly in Fig. 9. As is also clearly shown in said last named figure, the arm 11 is provided at its lower end with a slot 11^a which is preferably oppositely disposed to the slot 21 in the adjacent arm 20. The arm 10 is provided with a slot 10^a oppositely disposed to the slot 21 in the adjacent arm 11.

Journaled in the slotted lower ends of the two arms 20 and the arms 10 and 11 is a main feed roller shaft which is clearly shown in Figs. 2, 5 and 6. Said feed roller shaft comprises preferably three portions, a central portion 22 and two end portions 23.

The central portion 22 is provided near its ends with bearing portions 24 which rest in the slots 21 in the arms 20 and outside these bearing portions the central portion 22 is formed with a box or cup-like portion 25, one of these portions 25 being at each end of the main part 22 of the shaft. The main portion 22 of the feed roller shaft has secured upon it the main part 26 of the paper feed roller, said feed roller surrounding the shaft and being adapted to turn therewith. Each of the end portions 23 of the feed roller shaft carries an end part 27 of the feed roller at its outer end and is provided with a bearing portion 28 and a cup-like portion 29, the latter portion being at the inner end of the end portion or section 23. One of the bearing portions 28 is seated within the slot 11^a in the arm 11 and the other bearing portion 28 is seated within the slot 10^a in the hanger arm 10. The cup portion 29 of each end section 23 of the feed roller shaft is close to one of the cup portions 25 of the main part or section 22 of said shaft and the openings in said cup portions are in line with each other forming practically a single box-like receptacle within which is contained a double headed link 30 (Fig. 6). The heads 31 of said link 30 are provided with holes which are at right-angles to each other and which receive headed pins, pivots or rivets 32. The pins 32 pass loosely through the openings in the heads 31 of the link and one of said pins is secured in the walls of the cup-like portion 25, while the other of said pins is secured in the walls of the portion 29. The construction is such as to provide a universal or gimbal joint enabling the end portions or sections of the feed roller shaft to be moved independently of the main section of said shaft in any direction transversely thereof, though the main and end sections are compelled to turn together. The central section of said shaft and the end portions connected thereto by universal joints provide in effect a flexible shaft upon which the feed roller sections or portions, which go to make up the complete paper feed roller, are mounted and coöperate with the platen in a manner presently to be described.

A rod 33 extends from one of the arms 20 to the other of said arms and said rod is secured to said arms between their ends. A paper table 34 has the central portion of its lower end hooked or curled around the rod 33, (Fig. 3) said paper table extending upwardly and rearwardly from said rod and being adapted to be swung about said rod as a pivot. A short distance above its hooked or curled lower edge, the paper table 34 extends outwardly toward the sides of the machine, as indicated at 34^a (Fig. 4).

A feed roll release rod 35 passes through and is secured in the two arms 20 and in the arms 10 and 11, and the left end portion of said release rod, as appears clearly in Fig. 4, is bent forwardly and toward the left, its end entering and being loosely seated in a perforation in a feed roll release lever 36 which is journaled on the rod 6 which forms part of the platen carrier or frame. The construction is such that when the release lever 36 is pressed rearwardly it acts on the main feed roll through the release rod 35 and the arms 20 to move said feed roll away from the platen against the pressure of the coiled springs 14. The main feed roll 26 is constantly pressed toward the platen by the springs 14 acting through the hanger arms 10 and 11 on the flexible shaft 22, 23.

A paper apron 37 extends forwardly beneath the platen from the central portion of the main feed roll, said paper apron conforming to the curve of the platen and being provided at the sides of its rear portion with rearwardly and upwardly extending ears 38 (Fig. 4), said ears being of substantially the same width as the extensions 34^a of the paper table, their ends being reduced in width somewhat as at 38^a and curled or hooked around the release rod 9 beneath said extensions and between the ears 10 and 20 (see Fig. 2) at one side and the ears 11 and 20 at the other side of the machine. A screw 39 passes through a hole in each of the hook portions of the paper apron and is received in the rod 9, said screws serving to properly secure said paper apron to said rod. As will clearly appear from an inspection of Figs. 3 and 4, the paper apron 37 and paper table 34 form a practically continuous surface, save where the central section or part of the main feed roll protrudes between them to coöperate with the platen. The end portions or sections of the feed roll, it will be noted, are outside of the side edges of the paper apron and paper table and the feed-roller supporting arms or hangers and the rods coöperating with said arms all lie beneath said paper table and paper apron.

Referring now to the paper feeding devices at the front side of the platen, these preferably comprise a pair of members for feeding, guiding and controlling the paper, commonly termed paper fingers, mounted on a support above the platen; although, of course, it is to be understood that one only of said paper fingers may be employed if desired, and that they may be differently mounted. Above the platen axle, the side portions 5 of the frame are formed with upwardly and rearwardly extending arms 5^a, best shown in Fig. 3. The arms 5^a are bored out as indicated at 40 (Fig. 11) to receive bearing sleeves 41 which may be rotated in said bearing openings 40, but which are normally maintained in a fixed position by set screws 42 which enter threaded open-

ings in the arms 5^a and the ends of which coact with circumferential grooves 43 formed in said bearing sleeves. Thus, the inner end of each screw 42 enters the circumferential groove in the associate bearing sleeve and prevents an outward axial movement of the sleeve and the sleeve is secured in its rotative adjustment by the inner end of the screw-bearing against it. The bearing sleeves are provided with enlarged collar portions 44 which lie outside of and close to the arms 5^a, said collar portions each being provided with openings 45 adapted to receive a tool for imparting rotary adjustment to the bearing sleeve. The bearing sleeves are bored out centrally to provide bearings for the cylindrical end portions 46 of a rod 47 which extends from side to side of the platen frame or carrier above the platen. The ends of the cylindrical portions 46 are threaded and receive locking or check nuts 48 which abut the collar portions 44 of the bearing sleeves, and tend to prevent the side portions of the platen frame from being spread, bent or otherwise distorted. Coiled springs 49 surround the portions 46 of the rod 47, each of said coiled springs having one end secured to said rod and the other end secured to the adjacent bearing sleeve 41.

The main portion of the rod 47 between the cylindrical end portions 46 is preferably square in cross-section and is adapted to receive one or more paper fingers, designated as a whole by the reference numeral 50 and comprising, as clearly appears in Fig. 10, a hub-like portion 51, an actuating finger piece 52, an arm 53 off-set inwardly from the carrying arm or support 53^a and provided near its inner end with a guiding portion 54, and also with a shaft bearing portion 55 and contact portions 56. The hub portion 51 of the paper finger has its rear side open and is cut out to fit over or embrace the square rod or bar 47, being substantially C-shaped in cross-section. The outer end of the opening in the hub-like portion is counter-bored cylindrically so that the paper finger may be slid outwardly over the spring 49, as far as the arm 5^a of the platen frame, without being obstructed by said spring. The hub portion is provided at its rear edges with rearwardly extending lugs 57 which receive a screw 57^a which extends across the opening or slot in the rear side of said hub-like portion and prevents the accidental detachment of the paper finger after it has been properly mounted on the bar 47. The bearing portion 55 near the end of the off-set arm 53 of the paper finger is slotted near its lower end, as indicated at 58 (Fig. 3), and bearing in said slot is a feed roll shaft 59. A screw 60 extends across the open mouth of and thus closes the slot 58 after the feed roll shaft is in place. The feed roll shaft 59 has feed rolls 61 and 62 fixed on it, one at each side of the bearing portion 55. The shaft extends beyond or outside of said feed rolls so that its ends are adapted to coöperate with the flat contact edges 56^a (Figs. 3 and 10) of the portions or lugs 56. Each of the feed rolls lies between and is partly embraced by one of the contact portions 56 and the bearing portion 55. The shaft 59 is loosely journaled in its bearing slot 58 in the portion 55 so that it may oscillate or turn freely to permit one or another of the feed rolls to be moved toward or away from the platen in a radial direction, but oscillatory movement up and down or in a direction tangential of the platen by said shaft and feed rolls is prevented by the contact edges of the portions 56 which latter lie above and abut against the ends of said shaft and hold it firmly against such up and down movement.

The operation of the devices above explained may be briefly outlined. The paper fingers are first adjusted so that as the paper is fed around the platen the inner marginal feed rolls 61 only engage the paper, while the outer marginal feed rolls 62 will be outside the edges of the paper and will remain in contact with the platen. This arrangement will be understood from an inspection of Fig. 1, wherein the paper is indicated by dotted lines and is marked with the reference character *a*. In order to adjust the paper fingers along the support 47, said support is turned or swung rearwardly in the bearing sleeves 41 by rearward pressure exerted against the actuating finger piece 52 of one of the paper fingers, thereby communicating rotary motion to the bar 47 against the pressure of its springs 49 and swinging both paper fingers upwardly so as to move the margin feed rollers 61 and 62 out of contact with the platen. In this position the other of the two paper fingers may be slid freely lengthwise of the rod 47 until said paper finger is in proper position, considered longitudinally of the platen. Thereupon rearward pressure is transferred to the adjusted paper finger and the first paper finger is then properly adjusted longitudinally of the platen. As soon as rearward pressure against the finger portion 52 is removed the springs 49 swing the rod 47 forwardly in its bearings until the feed rolls in the paper fingers contact with the platen with a pressure depending upon the tension of the springs 49. The tension of said springs may be regulated by loosening the set screws 42 and then communicating rotary motion to the bearing sleeves by a turning tool inserted in the holes 45. The turning of the bearing sleeves 43 will serve to wind or unwind the springs 49 until the proper degree of tension is obtained, whereupon

the set screws 42 are tightened to maintain the bearing sleeves in desired position. The pressure of the springs 49 tends to maintain the paper fingers in adjusted position longitudinally of the platen.

The paper fingers being properly adjusted, the paper *a* is introduced into the machine over the paper table 34 and is guided by the latter down between the platen and the central section 26 of the main feed roller, and is thence fed or line spaced in a known manner over the paper apron 37 forwardly and upwardly between the platen and the feed rolls 61. It will be noted from an inspection of Figs. 2 and 5 that the end portions 27 of the main paper feed roller are at the extreme ends of the platen; consequently the end portions 27 will be outside of or beyond the side edges of all ordinary widths of paper and will act as friction rolls, remaining at all times in contact with the surface of the platen when ordinary widths of paper are employed. The platen is somewhat wider than the length of any line that can be written upon it (said line being of less length than the distance between the end portions 27 of the feed roller) so that there would be a waste in employing paper of abnormal width. The universal joints connecting the end portions of the feed roll shaft with the central portion of said shaft permit the central portion 26 of the feed roller to be moved away from the platen as the paper is passed downwardly between them, while at the same time the end portions 27 of the feed roller are not moved away, but remain in direct contact with the platen. This relation of the parts is shown in Fig. 5 and the construction enables the feed roller to be directly turned by the platen at all times and to be turned independently of the contact of the feed roller with the paper on the platen. It is of especial advantage when a number of sheets are to be entered and written upon at the same time, as in manifolding work. Prior to my present invention it frequently occurred that the sheet nearest the platen would cling to the latter and be fed around while the outer sheet or sheets would be stopped when they contacted with the feed roller and would be held back so as to impair and change the correct and proper relative arrangement of the sheets which, of course, should be fed together in the relative arrangement in which they are introduced into the machine. Furthermore, in such prior structures, even after the plurality of sheets had been fed into the machine and over the feed roller, the latter, being then completely separated from the platen, would have no direct connection or contact therewith and therefore would not at all times turn. The result would be that while the sheet in contact with the platen and one or more nearest to it would be fed around, those farther away from the platen would be held back, or, in other words, the sheets nearest the platen would "creep" ahead of those farthest away, thereby impairing the correct arrangement of the sheets. By my present invention the outer portions of the main feed roller are at all times in direct engagement or contact with the platen so that the central portion of said feed roll which engages the paper is frictionally driven by the platen and is given rotary movement whenever the platen is given rotary movement no matter how many thicknesses of paper there may be between said central portion and the platen. The result is that a number of sheets may be readily entered in the machine and fed around the platen without altering the initial relations of said sheets one to another.

When the paper has been line spaced or fed around with the platen by the usual mechanism until the leading edge or edges pass between the inner feed rolls 61 and the platen, said feed rolls 61 are moved radially of the platen and out of contact therewith, while the outer feed rolls 62 are at the same time forced into still closer contact with said platen than they normally have. The feed rolls 61 and 62 are fixed on the feed roll shafts 59 and consequently the rotary movement of the platen is transmitted directly from the outer roll 62 to the inner roll 61, thereby causing the latter to properly feed the paper at all times, as described above in connection with the main feed roll at the rear of the machine. The arms 53 of the paper fingers are brought downwardly and forwardly over the platen so that the feed rolls carried by said arms may be arranged as close to the printing line as possible, this arrangement conducing to a smooth and even feed of the paper. After passing between the platen and the feed rolls on the paper fingers the paper passes upwardly and rearwardly, being guided by the guide portions 54 of said paper fingers and thence is fed out of the machine over the supporting rod 47 and hence said supporting bar does not obstruct the operator's view of the writing. By offsetting the margin feed rollers 61—62 from the supporting arms 53^a in the manner described the said feed rollers may coöperate with the paper and the paper be directed over the supporting bar 47 without interference from the arms 53^a or the means which support the margin feed rollers. As previously explained the feed rolls on the paper fingers are prevented from moving up and down or sliding over the platen or the paper thereon by the coöperation of the ends of the feed roll shafts 59 with the contact portions 56^a of said paper fingers, while the construction is such that said shafts may be

skewed so as to allow the inner feed rolls to coöperate with the paper and the outer rolls to coöperate with the platen.

The broad principles governing the operations of my improved main paper feed roller device and my improved paper finger device are similar in some respects, and I have preferred to show said devices as cooperating together in one and the same machine. It is to be understood, however, that one of said devices may be employed separately and apart from the other, and, while I have shown one construction for each of said devices, that various changes may be made in the construction of the parts, in their arrangement and in their mode of operation without departing from the spirit and scope of my invention.

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

1. In a typewriting machine, the combination of a platen, a feed roller that presses the paper against the platen, a friction roll that bears directly upon the surface of the platen, and a flexible connection through which said friction roll drives said feed roller.

2. In a typewriting machine, the combination of a platen, an axle, a feed roller thereon, a second axle, a friction roll thereon, and a pivotal connection between said axles, said friction roll contacting directly with the surface of the platen and operating through said pivotal connection to drive said feed roller.

3. In a typewriting machine, the combination of a platen, hanger arms, a feed roller supported thereby, a friction roll, a hanger ~~arm~~ therefor, key controlled connections between the friction roll hanger arm and the feed roller hanger arms, and a spring connected with said friction roll hanger arm.

4. In a typewriting machine, the combination of a platen, hanger arms, a feed roller supported thereby, a friction roll, a hanger arm therefor, key controlled connections between the friction roll hanger arm and the feed roller hanger arms, a flexible connection between said feed roller and said friction roll, and a spring connected with said friction roll hanger arm and acting through said flexible connection on said feed roller.

5. In a typewriting machine, the combination of a platen, a feed roller, a shaft therefor, hanger arms supporting said shaft, friction rolls one at each end of said shaft, hanger arms for said friction rolls, flexible connections between said friction rolls and said shaft, key controlled connections between the feed roller hanger arms and the friction roll hanger arms, and springs connected with said friction roll hanger arms and acting on said feed roller through said flexible connections.

6. In a typewriting machine, the combination of a platen frame, a platen therein, a rod mounted in the sides of said platen frame, arms loosely mounted on and depending from said rod, a feed roller carried by said arms, a rod carried by said arms between their ends, and a paper table mounted on said last named rod, said paper table being adapted to guide the paper between said platen and said feed roll.

7. In a typewriting machine, the combination of a platen frame, a platen therein, a rod mounted in the sides of said platen frame, a paper apron mounted on said rod, arms loosely mounted upon and depending from said rod, a paper feed roller carried by said arms, a rod carried by said arms between their ends, and a paper table mounted on said rod.

8. In a typewriting machine, the combination of a platen frame, a platen therein, a rod mounted in the sides of said platen frame, a pair of spring-pressed arms journaled on said rod, a pair of arms loosely mounted on said rod, a feed roller shaft carried by said pairs of arms, and a feed roller on said shaft.

9. In a typewriting machine, the combination of a platen frame, a platen therein, a rod mounted in the sides of said platen frame, a pair of spring-pressed arms journaled on said rod, a pair of arms loosely mounted on said rod, a feed roller shaft carried by said pairs of arms and comprising a plurality of independently movable parts, and feed rolls mounted on said movable parts.

10. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, and a pair of feed rolls loosely mounted in said paper finger, said feed rolls being freely movable bodily in a direction radial of said platen and independently of said paper finger.

11. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, and a pair of feed rolls loosely mounted in said paper finger, said feed rolls being freely oscillatory in a direction radial of said platen and said feed rolls being immovable bodily tangentially of said platen.

12. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, a feed roll shaft loosely journaled on said paper finger, a pair of paper feed rolls on said shaft, and means for preventing bodily movement of said feed rolls tangentially of said platen, one of said feed rolls being adapted to be moved toward the platen when the other is moved away therefrom.

13. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, a feed roll shaft loosely jour-

naled on said paper finger, and a pair of paper feed rolls on said shaft, said shaft being adapted to contact with portions of said paper finger so that bodily movement of said feed rolls tangential of said platen is prevented.

14. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, said paper finger having a bearing portion, a feed roll shaft loosely mounted in said bearing portion, paper feed rolls on said shaft, one at each side of said bearing portion, contact portions on said paper finger outside said feed rolls, said contact portions being adapted to coact with the said feed roll shaft to prevent bodily movement of said feed rolls tangential of said platen.

15. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger, said paper finger being provided with contact portions and a bearing portion between said contact portions, a feed roll shaft loosely mounted in said bearing portion, paper feed rolls on said shaft, one between each of said contact portions and said bearing portion, the ends of said shaft projecting beyond said feed rolls and being adapted to co-act with said contact portions.

16. In a typewriting machine, the combination of a platen frame, a platen therein, a paper finger having an off-set arm, a paper guiding portion on said arm, a slotted bearing portion on said arm, a feed roll shaft loosely mounted in said slot, a screw confining said shaft within said slot, paper feed rolls on said shaft, one at each side of said bearing portion, contact portions on said off-set arm outside said paper feed rolls, said contact portions being adapted to coact with the ends of said feed roll shaft, which ends project beyond said feed rolls.

17. In a typewriting machine, the combination of a platen frame, a platen therein, a square spring-pressed rod or bar mounted in the sides of said platen frame, a paper finger, said paper finger having a C-shaped hub embracing said square rod, and a screw adapted to close the opening in said hub.

18. In a typewriting machine, the combination of a platen frame, a platen therein, rotary bearing sleeves on said platen frame, a bar or rod journaled in said sleeves, a paper finger on said bar, coiled springs surrounding said bar, each of said springs having one end secured to said bar and the other end secured to one of said bearing sleeves, said bearing sleeves being adapted to be turned to vary the tension of said springs, and said paper finger being counterbored to move over one of said springs, and means for securing said bearing sleeves in adjusted positions.

19. In a typewriting machine, the combination of a platen frame, a platen therein, rotary bearing sleeves journaled in the sides of said platen frame, said bearing sleeves having enlarged collar portions outside of and in contact with the sides of said platen frame, a bar journaled in said bearing sleeves, said bar having threaded ends, a paper finger on said bar, coiled springs surrounding said bar, each of said springs having one end secured thereto and the other end secured to one of said bearing sleeves, said sleeves being adapted to be turned to vary the tension of said springs, means to maintain said bearing sleeves in adjusted positions, and nuts on the threaded ends of said bar adapted to engage the outer faces of the collar portions of said bearing sleeves to prevent the spreading of the sides of said platen frame.

20. In a typewriting machine, the combination of a platen frame, a platen therein, rotary bearing sleeves journaled in the sides of said platen frame, said bearing sleeves being provided with circumferential grooves, screws in said platen frame engaging said grooves to maintain said bearing sleeves in adjusted positions, said bearing sleeves being provided with enlarged collar portions outside of and in contact with the sides of said platen frame, a bar journaled in said bearing sleeves, said bar having threaded ends, a paper finger on said bar, coiled springs surrounding said bar, each of said springs having one end secured thereto and the other end secured to one of said bearing sleeves, and nuts on the threaded ends of said bar adapted to coact with the collar portions of said bearing sleeves to prevent the spreading of the sides of said platen frame.

21. In a typewriting machine, the combination of a platen frame, a platen therein, a paper feed roller having a portion adapted to contact at all times with the platen during the feeding of the paper, a paper finger, a feed roll shaft loosely journaled on said paper finger, and a pair of paper feed rollers on said shaft, said shaft being adapted to contact with portions of said paper finger so that bodily oscillatory movement of said feed rolls tangential of said platen is prevented.

22. In a typewriting machine, the combination of a platen frame, a platen therein, a paper feed roller mounted on a flexible shaft and adapted to coöperate with said platen, a paper finger, a feed roll shaft loosely journaled on said paper finger, and a pair of paper feed rolls on said feed roll shaft, said feed roll shaft being adapted to contact with portions of said paper finger so that bodily oscillatory movement of said feed rolls tangential of said platen is prevented.

23. In a typewriting machine, the combi-

nation of a platen frame, a platen therein, a shaft mounted on said platen frame and comprising a plurality of parts independently movable, a paper feed roller part mounted on each of said independently movable parts, a paper finger, a feed roll shaft loosely journaled on said paper finger, and a pair of paper feed rolls on said feed roll shaft, said feed roll shaft being adapted to contact with portions of said paper finger so that bodily oscillatory movement of said feed rolls tangential of said platen is prevented.

24. In a typewriting machine, the combination of a platen frame, a platen therein, a supporting bar mounted in the sides of said platen frame, a paper finger mounted on said supporting bar, a pair of marginal feed rolls offset from said paper finger and supported thereon, said feed rolls being adapted to feed the paper over said supporting bar, one of said feed rolls being adapted to coöperate with the paper and the other of said feed rolls being adapted to contact with the platen at all times during the feeding of the paper.

25. In a typewriting machine, the combination of a rotary platen, and a main paper feed roller made up of a plurality of independent sections adapted to turn together, certain of said roller sections during the feeding of the paper pressing the paper against the platen and certain other of the sections always frictionally contacting directly with the platen proper and being adapted to turn the first named section or sections.

26. In a typewriting machine, the combination with a platen, of a feed roll that presses the paper against the platen and a friction roll that bears upon the surface of the platen and drives the feed roll.

27. In a typewriting machine, the combination with a platen, of a feed roll carrying at its end a friction roll, the axle of the friction roll being jointed to the axle of the feed roll and the friction roll being arranged to be driven by the surface of the platen and in turn to drive the feed roll.

28. In a typewriting machine, the combination with a platen, of a feed roll, hangers therefor, a friction roll, a hanger therefor, connections between the feed roll hangers and the friction roll hanger, and a spring acting on said hangers and said rolls.

29. In a typewriting machine, the combination with a platen, of a feed roll, hangers therefor, friction rolls, hangers therefor, connections between the feed roll hangers and the friction roll hangers, and springs acting on said hangers and said rolls.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 2d day of December, A. D. 1905.

ARTHUR W. SMITH.

Witnesses:
E. M. WELLS,
J. B. DEEVES.