H. C. FORD.

TYPE WRITING MACHINE.

APPLICATION FILED NOV. 1, 1906.

946,797.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.

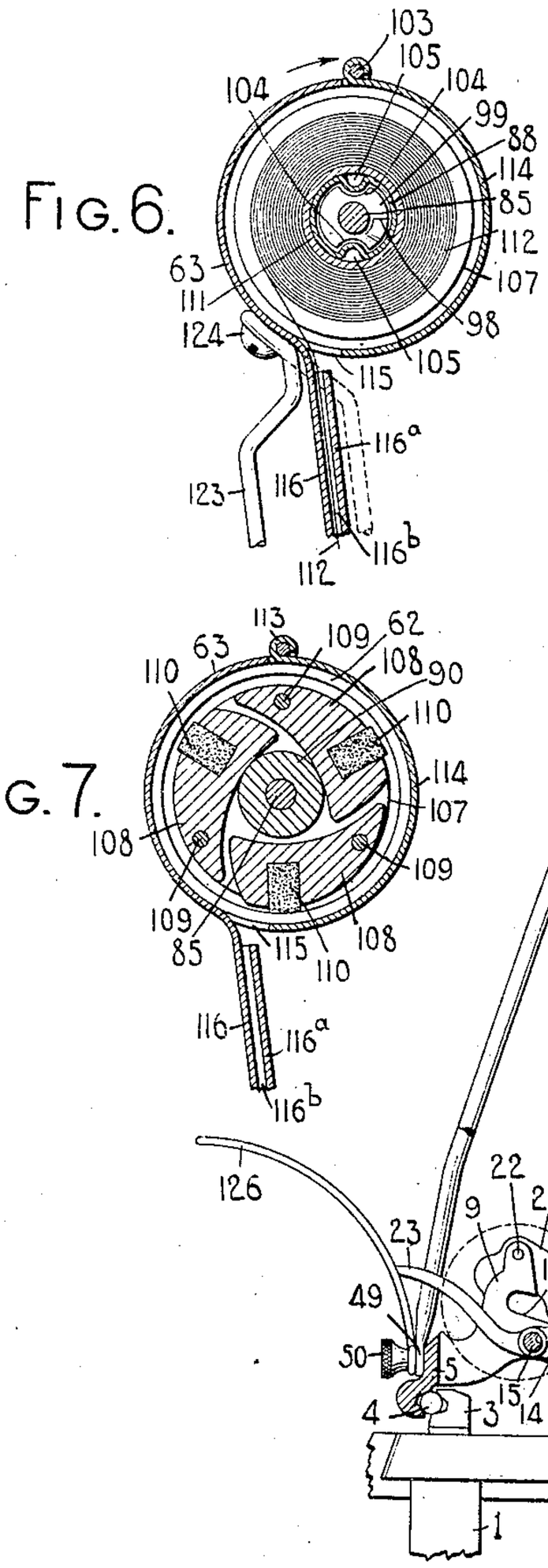

FIG. 6.

FIG. 7.

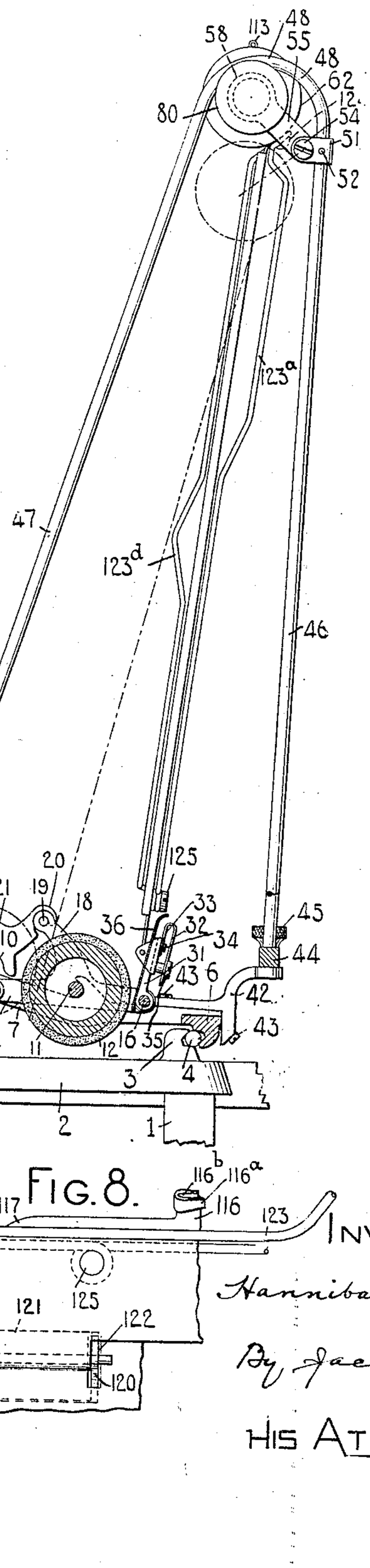

FIG. 1.

FIG. 8.

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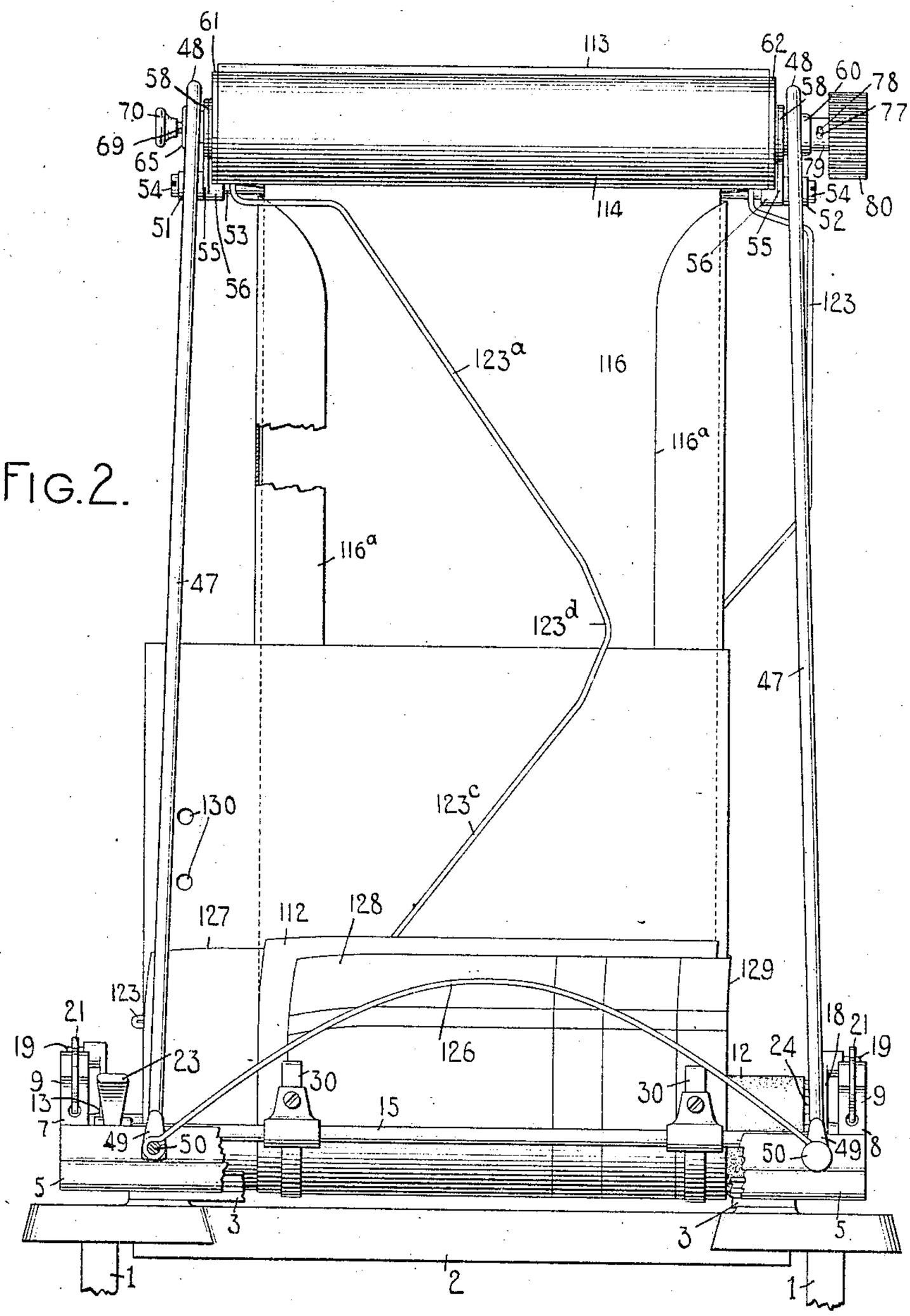
3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

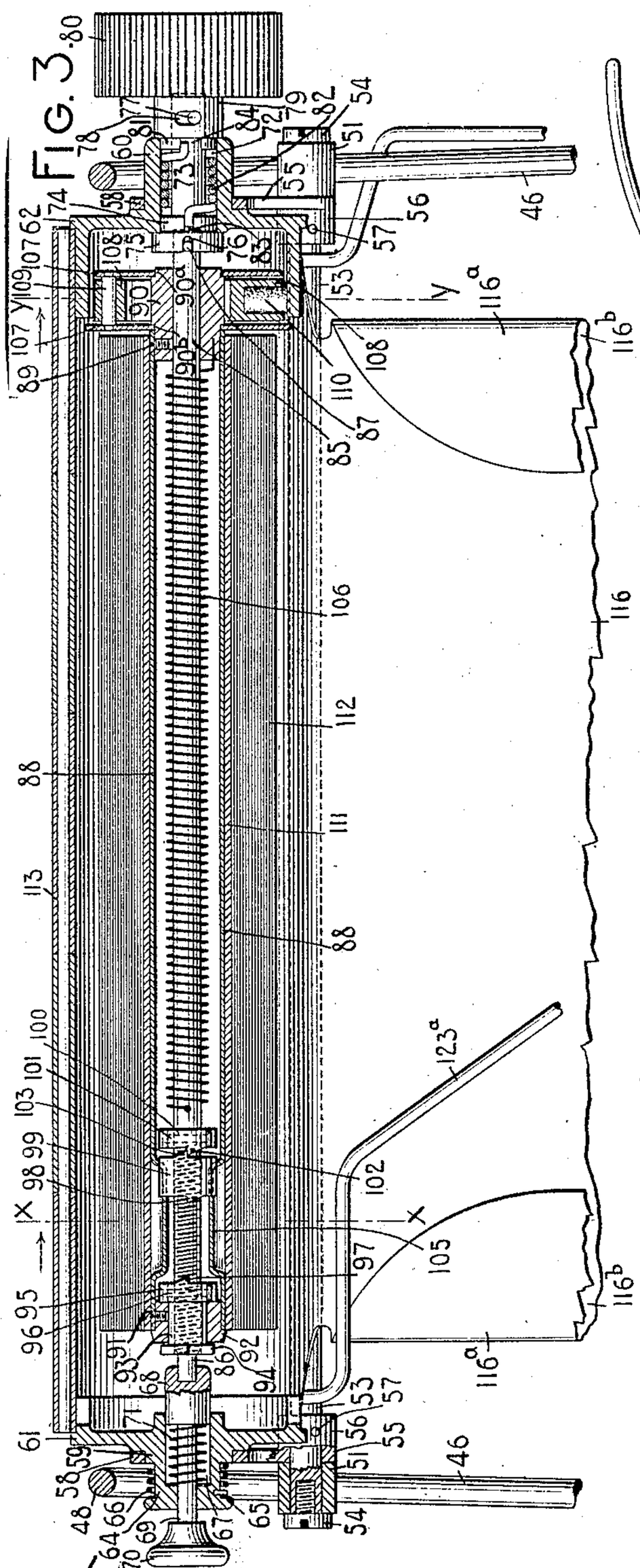

FIG. 3.

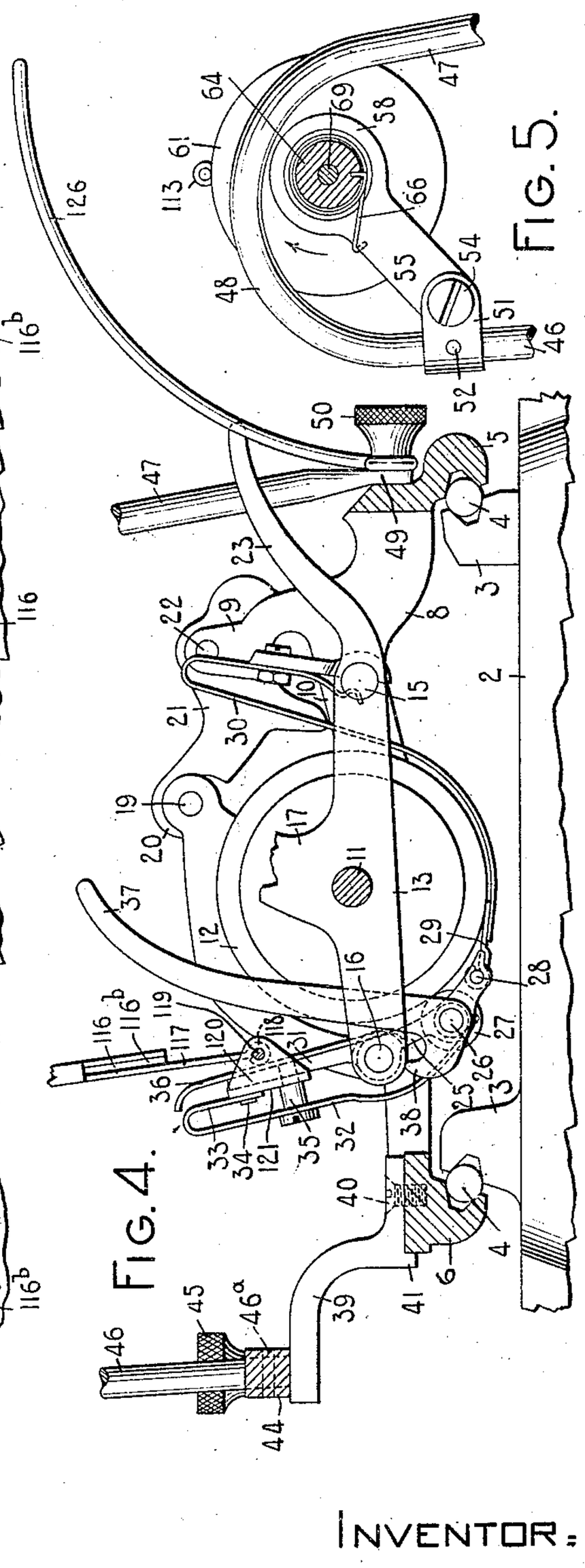

FIG. 5.

FIG. 4.

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UNITED STATES PATENT OFFICE.

HANNIBAL C. FORD, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE SMITH PREMIER TYPEWRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

946,797. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed November 1, 1906. Serial No. 341,588.

To all whom it may concern:

Be it known that I, HANNIBAL C. FORD, citizen of the United States, and resident of Syracuse, 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 more especially to paper supply and paper feeding devices for typewriting machines and is designed to improve certain features of the automatic roll holder device disclosed in the application of Harry I. Seddon, Serial No. 321,575, filed June 13th, 1906.

Among the objects of my invention are to provide a rotary material-carrying device which, after a printing operation, operates automatically to rewind the material unwound during said printing operation; to provide a governor for controlling the speed of said material-carrying device during its rewinding movements; to provide means for preventing overthrow or excess movements of said material-carrying device at the end of its rewinding movements; to provide an improved disconnectible connection between the chute or guide-way for the material and a so-called rocker platen frame; to provide improved means for supporting the roll holder and chute; and to provide improved means for guiding a folded work sheet so that the chute may be included between the folds of said work sheet.

Other objects will appear in the course of the following specification.

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

In the present instance in carrying out my invention, I arrange a detachable frame comprising V-shaped side arms on the carriage of the typewriting machine, and pivotally mount at the upper end of said frame a casing in which is journaled a rotary material-carrying device or roll holder on which a roll of carbon paper is supported. A chute or guide-way integral with the casing extends downwardly therefrom and has an improved pivotal connection with the platen frame. The carbon paper passes downwardly from the roll holder through the chute and between the platen and the usual paper feed roller so that when the platen is turned for line spacing the carbon paper is fed around with said platen, being unwound from the roll holder and drawn downwardly through the chute. In connection with this device I preferably employ folded bill sheets of the kind commonly used in commercial billing, each of said bill sheets being first brought into coöperation with the chute, one of the parts of said bill sheet passing in front of said chute having the carbon paper within it and the other of said parts passing behind said chute, the parts of said bill sheet being guided by improved guiding devices so as to properly coöperate with the chute, the fold of the bill sheet engaging with one of the side edges thereof, said side edge thus serving as a side guide. As the folded bill sheet is fed around with the platen in the usual way, the carbon paper will be fed around at the same time between the parts of the bill sheet, so that when the printing instrumentalities are operated one part of the bill sheet will receive impressions directly from the usual inking ribbon and the other part of the bill sheet will receive impressions from the carbon paper, the result being that two copies of the work are made. When the writing on the bill sheet has been finished the latter may be fed forwardly out of the machine and is then held by the operator while the usual paper feed roll release is actuated.

In connection with the roll holder I provide an improved automatic returning mechanism for the carbon paper, which mechanism is operative to rewind on the roll holder an amount of carbon paper equal to that unwound during the printing operations. The actuation of the feed roll release brings the automatic returning mechanism into operation so that the used portion of the carbon paper will be drawn back through the machine to the position from which it was started when the feeding of the bill sheet in line space direction was begun. Governing or controlling devices regulate the speed at which the return movement of the roll holder and carbon paper takes place and I also preferably employ a device in the nature of a friction clutch which while permitting the roll holder to be turned by hand in either direction at the same time prevents or holds it from excess movement when the automatic returning mechanism is operat-

ing. After the withdrawal of the first bill sheet other bill sheets may be written and the carbon paper automatically returned in the same way until its printing surface has become exhausted, whereupon the exhausted portion may be fed forward and detached so that a fresh portion of carbon paper may be employed for writing a plurality of succeeding bill sheets.

The invention is shown as applied to the No. 4 Smith Premier typewriter which is a machine of the rocker platen style, the platen being mounted in a platen frame which may be rocked to and fro on the platen carriage. The lower portion of the chute is pivotally connected with the platen frame so that said chute may be substantially tangential of the platen in either of the positions to which the latter may be rocked, the arrangement facilitating a smooth and easy feeding of the carbon paper to the platen. It will be obvious, however, that various features of the invention are not limited to the rocker platen style of typewriters but may be readily adapted to other forms of writing machines.

In the accompanying drawings, Figure 1 is a side view on a reduced scale of the upper part of a typewriting machine showing my invention applied thereto, the platen and platen carriage being shown in section and other parts being shown in section or broken away for the sake of clearness. Fig. 2 is a front elevation of the upper part of the machine with my invention in place thereon, parts being broken away, said figure being drawn to the same scale as Fig. 1. Fig. 3 is a substantially full-sized fragmentary front view of my improvements, the roll holder and its casing and bearings being shown in longitudinal section. Fig. 4 is a substantially full-sized fragmentary side view, partly in section of the carriage and its bearings, part of my invention being shown in combination with said carriage. Fig. 5 is a substantially full-sized fragmentary side elevation, partly in section, showing my novel method of mounting the roll holder. Fig. 6 is a transverse sectional view of the roll holder, its casing and the upper part of the chute and the guide for the work sheet, said section being taken on a plane represented by the line x—x in Fig. 3 and looking in the direction of the arrow at said line. Fig. 7 is a transverse sectional view taken on a plane represented by the line y—y in Fig. 3 and looking in the direction of the arrow at said line, said Fig. 7 illustrating the governing or controlling device for the roll holder. Fig. 8 is a fragmentary front elevation showing the connection between the chute and the platen frame.

In the drawings, corner posts 1 of the machine frame sustain a top plate 2 on which are fixed a pair of track-ways 3 which are longitudinally grooved to receive antifriction balls 4. Coöperating with the balls are grooved front and rear bars 5 and 6, respectively, said bars being joined at their ends by side bars 7 and 8 and constituting with said side bars a platen carriage. Each of the side bars is provided with an upstanding arm 9 and has an inclined slide-way 10 which coöperates with the axle or shaft 11 of a platen 12, said axle being journaled in a platen frame comprising side bars 13 and 14, a front bar 15 and a rear bar 16. The side bars of the platen frame are provided with upwardly extending portions 17 and 18 from which project lateral studs 19, said studs normally engaging with the hooked ends 20 of spring-controlled latches 21 pivoted at 22 in the portions 9 of the side bars of the carriage. A finger piece or lifting handle 23 is secured to the front bar 15 of the platen frame near its left end. The normal relations of the platen, the platen frame and the carriage are illustrated in Fig. 1.

It will be understood that when the lifting handle 23 is raised the platen is rocked forwardly and upwardly, the platen axle sliding and turning on the slide way 10 and the platen being rocked forward to expose the writing.

It is not deemed necessary to describe the construction and mode of operation of the carriage and platen frame at greater length as these parts in themselves are not of my invention and are well known in the art. The carriage, it will be understood, is controlled by a carriage spring and step-by-step letter feeding devices which coöperate in the usual way, when the printing keys of the machine are operated, to move the carriage a letter space distance at a time leftward over the top plate and longitudinally of the track-ways 3. The rocking motion of the platen frame, it will be noted, is transverse of the letter space feed movement of the carriage. At its right-hand end the platen is provided with a line space ratchet wheel 24 which is actuated by the usual line spacing handle and pawl (not shown) to rotate the platen on its axis to space between the lines of writing.

Loosely hung on the rear bar 16 of the platen frame are depending arms or links 25 (only one of which is shown) which support a feed roll shaft 26, said shaft carrying a two-part feed roller 27 which extends longitudinally of the platen at its rear as will be understood from an inspection of Fig. 4. The lower ends of the links 25 pivotally support at 28 a paper plate 29, said plate being maintained in coöperative relation with the platen by the rearward extensions of resilient paper fingers 30 supported on the front bar 15 of the platen frame. Upwardly extending arms 31 fixed to the rear

bar 16 of the platen frame support leaf springs 32 the lower ends whereof coöperate with the feed roll shaft to press the feed roller 27 toward the platen. The forwardly and downwardly bent upper portions 33 of the leaf springs 32 engage studs 34 projecting rearwardly from the arms 31 and said leaf springs are maintained in engagement with said studs by shouldered screws 35 which screw into the arms 31 below the studs 34. A paper table 36 is secured at the front side of the arms 31 and extends downwardly and forwardly toward the platen as shown in Fig. 4. A feed roll release lever 37 is fixed to the feed roll shaft 26 at the left of the platen, said release lever being provided with a lug 38, which, when the release lever is operated, coöperates with the rear bar 16 of the platen frame in such a way that forward and downward pressure on the release lever operates to swing the feed roller 27 and the paper plate 29 away from the platen to release or free the paper.

Referring now to the devices with which my improvements are more directly concerned I prefer to mount them in a frame on the platen carriage, which frame may be readily detached when it is not desired to make use of said devices. I therefore provide an improved construction of detachable frame, but it is to be understood that various features of my improvements are applicable whether mounted on the carriage in the manner presently to be described or in any other suitable manner or whether mounted on the frame of the machine.

My improvements are especially useful in billing work and as in such work a tabulator of some sort is commonly employed, I prefer to mount the detachable frame carrying my improvements on the tabulator column stop bar. As shown in Fig. 4 a bracket 39 is secured by a screw 40 to the rear bar 6 on the carriage near its right-hand end, said bracket being provided with a shoulder 41 which prevents rotary movement of the bracket on its screw. At the left and rear of the carriage frame as shown in Fig. 1 a second bracket 42 is secured by set screws 43 in a fixed relation with the cairriage frame. A toothed column stop bar 44 of the usual construction is removably secured by thumb screws 45 to the rear end portions of the brackets 39 and 42. Near each end the stop bar 44 is formed with a vertically disposed opening which receives the lower end of the rear arm 46 of a frame rod which is shaped substantially like an inverted V and comprises, in addition to the rear arm 46 which is vertically disposed, an inclined forward arm 47, the two arms 46 and 47 being joined at the top by a curved portion 48. The ends of the rear arms 46 are secured to the stop bar 44 in any suitable manner as by cross pins 46ª. The lower end portion of the forward arm 47 of each frame rod is flattened as indicated at 49 (Figs. 1 and 4) and is formed with a hole which receives a thumb screw 50, the latter entering a threaded opening in the front bar 5 of the carriage frame. It will be seen that the two V-shaped rods and the column stop bar 44 constitute a frame which may be readily detached from the carriage by removing the thumb screws 45 and 50. This frame, while comparatively light and adding but little to the weight of the carriage, is strong and rigid and well adapted to carry the devices presently to be described.

It will, of course, be understood that when it is desired to make use of the tabulator without employing my present invention a column stop bar without the frame rods may be substituted for the one just described or the latter may be detached from the frame rods by removing the pins 46ª. A bearing block 51 is secured to the rear arm 46 of each frame rod near the top thereof by a pin 52, the two bearing blocks being formed with bearing openings which receive the end portions of a rock shaft 53, the latter being adapted to turn in the bearing blocks but being held from endwise motion therein by headed screws 54 which screw into the ends of the rock shaft as shown in Fig. 3. The heads of the screws 54 are adapted to contact with the outer end faces of the bearing blocks and serve not only to prevent endwise displacement of the rock shaft but also to hold the upper end portions of the frame rods in proper relation, preventing them from spreading apart. Crank arms 55 are supported on the rock shaft 53 by their hubs 56 which are secured to the rock shaft by pins 57.

The free ends of the crank arms terminate in ring-like bearing portions 58 as best shown in Figs. 3 and 5, the openings in said ring-like portions receiving the outwardly extending hubs 59 and 60 of the heads or end pieces 61 and 62 of a casing for a material-carrying device or roll holder presently to be described. These heads 61 and 62 are preferably of cast metal and are joined by a segmental cover or casing proper of sheet metal, said casing being designated by the numeral 63 and being suitably secured to the end pieces or heads.

It will be understood that the casing as a whole comprises the heads 61 and 62 and body portion 63 and that said casing is pivotally mounted in the bearing openings in the ring-like ends 58 of the crank arms 55, so that said casing may be turned on its bearings in said crank arms. Furthermore, the rock shaft 53 and the crank arms 55 may be turned in the bearing blocks 51 so that the casing above described may also have a

rotary motion about the axis of said rock shaft. The left-hand head 61 of the casing in addition to the hub 59 is provided with a boss 64 of lesser diameter, said boss terminating in a head 65. A coiled spring 66 surrounds the boss 64 and has one end secured in said boss, the other end of said coiled spring being secured in the left-hand crank arm 55 as shown in Fig. 5. The spring 66 serves as a counterbalancing spring and tends to maintain the crank arms 55 and the casing raised in the positions shown in full lines in Fig. 1 and in Fig. 5. The boss 64 is counterbored as shown at 67 (Fig. 3) and the counterbore receives a plunger 68, the stem 69 whereof extends outwardly through an opening in the head of the boss and is provided with a finger button 70 for retracting the plunger. Confined between the closed end of the counterbore 67 and the plunger 68 is a coiled spring 71, said spring surrounding the stem of the plunger and tending to press said plunger constantly rightward or toward the middle of the machine. The hub 60 of the right-hand head 62 is elongated and is formed with a central bore 72 as shown in Fig. 3, the bore 72 receiving a short shaft 73, the diameter of said shaft being somewhat less than the diameter of the bore 72. Near its left-hand end the shaft 73 is enlarged to provide a bearing portion 74 which coöperates with the left-hand end portion of the bore 72 and outside said bore and contiguous to the head 62 the shaft 73 terminates in a head 75 which is formed with a central depression and a cross slot 76. Near its right-hand end the shaft 73 is provided with a pin 77 which coöperates with an elongated slot 78 formed in the neck 79 of a knurled finger wheel 80. The neck 79 is counterbored to receive the end portion of the shaft 73 and is provided at its inner end with a reduced portion 81 which fits in and bears against the bore 72 of the boss 60. Surrounding the shaft 73 within the bore 72 is a coiled spring 82, the inner end of which is held in a slot 83 formed in the bearing portion 74 of the shaft and the outer end of which is adapted to contact with one side of a slot or cut-away 84 formed in the reduced portion 81 of the neck 79. The spring 82 tends constantly to expand, and as its inner end is held fast in the slot 83, said spring, by reason of its frictional engagement with the bore 72, serves to frictionally maintain the shaft 73 in any position to which it may be adjusted.

The adjusting operations will be referred to more at length hereinafter. It will be noted that the shaft 73, when it is turned, will, by reason of the pin and slot connection 77, 78, turn the finger wheel 80 and friction spring 82, and when the finger wheel is turned it will turn the shaft. During the turning movements the shaft and finger wheel have bearings at 74 and 81 respectively in the bore 72. Endwise movement of the shaft and finger wheel is prevented by reason of the contact of the head 75 and of the neck 79 with respectively the inner and outer ends of the boss 60. The plunger 68 and the shaft 73 provide end supports for a main shaft 85 upon which the roll holder, presently to be described, is mounted. The left-hand end portion 86 of the main shaft 85 is reduced and bears in a central depression in the end of the plunger 68. The right-hand end portion of the main shaft 85 is received in the central depression in the head 75 of the shaft 73 and carries a cross-pin 87 which engages with the cross slot 76. By this means the shaft 85 is connected with the shaft 73 so that when one is given rotary movement the other is caused to rotate with it and in effect the bearing portion 74 and the neck 78 serve as bearings for the shaft 85 at the right-hand side thereof, while at its left-hand side said shaft bears in the central depression in the plunger 68. It will be noted that the axis of the shaft and the pivotal axis of the casing 63 in the crank arms 55 are coincident.

Surrounding the shaft 85 is a sleeve 88, said sleeve being secured at its right-hand end by a screw 89 to a bearing block 90 which bears on the right-hand end portion of the shaft 85. At its left-hand end the sleeve 88 is secured by a screw 91 to a bearing block 92 which is adapted to turn on a bushing 93 having a polygonal head 94. The left-hand end portion of the shaft 85 is threaded and the bushing 93 is threaded interiorly to coöperate with the threads on the shaft, the polygonal head 94 affording a convenient means for adjusting said bushing on the shaft. The bushing is screwed on the shaft until its inner end contacts with a stop member 95 which is fixed to the shaft by means of a pin 96. Said stop member besides limiting the movement of the bushing is provided with a tooth or stopping portion 97 which is adapted to coöperate with a tooth or contact portion 98 on a nut 99 which is adapted to travel back and forth on the threaded portion of the shaft 85 in a manner presently to be described between the stop member 95 and another stop member 100 at the right of the stop member 95, said stop member 100 being secured in place on the shaft 85 by a pin 101 and being provided with a stopping portion or tooth 102 which coöperates with a contact portion 103 on the traveling nut 99 and is oppositely disposed to the contact portion 98. The collars 95 and 100 would, of course, arrest the nut 99 without the teeth 97, 98, 101 and 102, but the nut would be likely to bind when arrested, so that it might not be as easy to start it in the opposite direction as is de-

sirable. The teeth arrest the nut abruptly without binding.

As shown in Figs. 3 and 6 the traveling nut 99 is provided with oppositely disposed grooves or depressions 104 which coöoperate with oppositely disposed corrugations or depressions 105 formed longitudinally in the sleeve 88. To enable the parts to be assembled the stop-member 95 is also formed with oppositely disposed grooves or depressions similar to the grooves 104 in the nut 99. The construction is such that the nut 99 and the sleeve 88 always turn together while at the same time the nut may travel back and forth along the threaded portion of the shaft 85 effecting a relative endwise movement between said nut and said sleeve. A wire spring 106 is coiled around the shaft 85 between the stop member 100 and the bearing block 90, the left end of said spring being fixed in the shaft 85 and the right end of said spring being fixed in the bearing block. The shaft 85 is ordinarily held fixed by the friction of the spring 82 acting through the shaft 73; and the tension of the spring 106, which is insufficient to overcome the friction spring 82, is exerted to turn the bearing block 90, the sleeve 88 fixed thereto and the nut 99 controlled by said sleeve in the direction of the arrow in Fig. 6. This tends to cause the traveling nut to travel, as it turns, along the threaded portion of the shaft 85 from left to right and the spring 106 will be effective to turn the sleeve 88 and the nut 99 until the contact portion 103 on said nut engages with the stop portion 102 on the stop 101 as shown in Fig. 3 which shows the nut in its normal position. The purpose of the constructions will be more clearly understood from later explanations From an inspection of Fig. 3 it will be noted that the distance between the stop member 95 and the head 94 of the bushing is somewhat greater than the thickness of the bearing block 92 so that the returning movements of said bearing block on the bushing are not interfered with.

From what has been said it will be apparent that the sleeve 88, while adapted to turn relatively to the shaft 85, is normally maintained in a fixed relation therewith by reason of the engagement of the traveling nut 99 with the stop member 100. The sleeve 88, however, which is adapted to carry the roll-holder proper, as will presently be described, may be turned against the tension of the spring 106 and relatively to the shaft 85 in order to unwind the carbon paper. To regulate the speed at which the rewinding thereof may take place under the influence of the spring 106, and in order to prevent undue shock, I preferably employ a governing device or retarding mechanism comprising a pair of circular plates or flanges 107 as shown in Fig. 3. The flanges are spaced apart and mounted on the bearing block 90, being held in fixed relation therewith in any suitable manner. Preferably, as shown in Fig. 3, the outer end portion of the bearing block is reduced as indicated at 90^a and the outer plate 107 is perforated to fit over the reduced part 90^a, the latter being upset or spread as shown after the outer plate 107 is in place, so as to secure it in fixed relation with the bearing block 90. The inner plate 107 is perforated to fit over a reduced part 90^b on the block 90, and, of course, must be arranged in place before the sleeve 88 is assembled, the end of said sleeve being adapted to contact with said inner plate 107 and to maintain it against the shoulder formed by the reduced part 90^b.

Arranged between the two plates 107 as appears in Figs. 3 and 7 are a plurality of members or weights 108, preferably three in number, said weights being hung on shouldered rivets 109, the ends whereof are received in openings in the plates 107. The weights 108 are provided with friction pads 110 and during the rapid return movement of the sleeve 88 the weights are adapted to be swung outwardly about the pins 109 by centrifugal force, the degree of which depends on the speed at which the sleeve 88 and the plates 107 are turned. The ends of the friction pads 110 protrude from the surface of their respective weights and when the latter are swung or thrown outwardly as just described, the friction pads are caused to engage with the inner face of the right-hand head 62, exerting a friction thereagainst and retarding the turning movement of the sleeve 88. In case the speed becomes too great it will be automatically reduced by the increased friction of the pads 110.

A tubular material-carrying device or roll holder 111 is arranged on the sleeve 88 and preferably is frictionally maintained in fixed relation therewith, although, if desired, a positive connection between the two parts may be employed. The roll holder carries a roll of carbon paper or other material designated by the numeral 112. The segmental portion 63 of the casing or cover for the roll holder and the material carried thereby is at the back of the carbon roll 112 as best shown in Fig. 6. Hinged at the top of the casing at 113 is a segmental cover 114 which normally covers the front part of the carbon roll and which may be thrown back to expose it for removal or other purposes. As shown in Figs. 6 and 7 the lower edge of the cover 114 terminates a short distance in front of the lower portion of the casing 63, leaving a space designated by the numeral 115, through which space the free end of the carbon may be drawn. Except for this space or slit the casing and its cover completely inclose the carbon roll holder ordi-

narily so that the carbon paper is not exposed to the air.

A chute or guide-way for the carbon paper or other material carried by the roll holder is provided to guide said carbon paper downwardly toward the platen and to cause it to coöperate properly with said platen. Preferably this chute is made of light sheet metal, such as aluminum, and is formed integrally with the segmental part 63 of the casing as shown clearly in Figs. 3, 6 and 7, the chute being designated therein by the numeral 116. The chute and the cover or casing form in the preferred construction a single frame-like part or frame. The sides 116[a] of the chute are bent inwardly toward each other to form grooves or slots 116[b] through which the side edge portions of the carbon paper may pass. The chute extends downwardly and forwardly toward the platen, being normally arranged in a plane substantially tangential of said platen at the rear as shown in full lines in Fig. 1. The lower edge of the chute is inclined and terminates slightly below and forwardly of the upper part of the paper table 36, and at its lower left-hand corner the chute is provided, as seen at Fig. 8, with an off-set 117, the lower end of which is curled as indicated at 118 (Fig. 4) to receive a removable pin 119, said pin being supported in ears 120 of a bracket 121. The bracket is secured at the back of the left-hand arm 31 and in front of the part 33 of the left-hand spring 32, said bracket being perforated to receive the left-hand stud 34 and being maintained in place by the left-hand headed screw 35. The right-hand ear 120 of the bracket 121 projects forwardly through a slot 122 formed in the paper table 36. By means of the bracket 121 and the pin 119 the chute 116 and the platen carriage are pivotally connected together. In order to disconnect the parts it is only necessary to withdraw the pin 119 which is frictionally secured in the ears 120 of the bracket.

My invention is adapted to the use of writing a bill sheet having a longitudinal fold therein, and it is contemplated that when said sheet is to be inserted in the machine it is first placed upon the chute 116, one part or leaf of the sheet being behind the chute and the other part or leaf in front thereof. the longitudinal fold coöperating with the right-hand edge of the chute. In order to hold both leaves of the sheet close to the chute I have provided a guide wire 123 bent in the manner shown in the drawings. This guide wire comprises two branches, one of which passes back of and the other in front of the chute. The rear branch lies close to the back of the chute beginning near the lower left-hand corner thereof and inclined upward and toward the right and reaching the right-hand edge of the chute about midway of the length of the latter. The wire is thence bent toward the back of the machine, still extending backward and toward the right, as shown in Figs. 1 and 2, and said wire is then bent upward forming an off-set portion 123[a] that is substantially parallel with the edge of the chute, but that is off-set from the edge of the chute toward the right and toward the back of the machine. From the upper end of this off-set portion 123[a] the wire is bent toward the left and toward the front, its end being secured to the rear side of the casing 63 near the right-hand end of said casing by a screw 124 (Fig. 6). Near the lower left-hand corner of the back of the chute the wire 123 is bent into a loop 123[b] (Fig. 1), and a screw 125 passing through said loop and threaded into the projection 117 of the chute secures the wire to the chute at this point. From said point the wire extends horizontally to the left beyond the projection 117 where it is bent forward and to the right extending then in front of the chute as shown in Figs. 1 and 8. Said wire is thence bent upwardly, extending at an inclination toward the right as shown in Fig. 2 at 123[c], and at 123[d] about the middle of the chute said wire is bent toward the left, the part 123[e] thereof extending upward and toward the left to a point near the top of the chute. The upper end of this branch of the wire is thence suitably bent and is secured to the rear of the casing 63 near the left-hand end thereof by a suitable screw similar to the screw 124. Near the point 123[b] the wire is bent outward from the face of the chute as shown in Fig. 1. This outwardly bent part of the front branch of the wire and the off-set part 123[a] of the rear branch of the wire constitute mouths which receive the paper conveniently as it is passed over the chute from the right when placing said paper in position on the chute. It will be understood that by means of the single wire shaped and attached as shown, I am enabled to provide a light and efficacious guide for both parts of the work sheet. If desired, an additional guide wire 126, attached to the carriage at its ends by the thumb screws 50, may be employed for receiving the work sheet and carbon paper as they leave or are fed away from the platen after being written on, said guide wire 126 being curved from its ends upwardly and forwardly as shown in Figs. 1 and 2.

Each of the bill sheets comprises two parts: a wide part 127 and a narrower part 128, the two parts joining at one side along their longitudinal edges in a fold or crease 129. The narrow part 128 is suitably ruled and forms the bill proper which preferably receives impressions directly from the inking ribbon. The wider part 127 preferably

receives impressions from the carbon paper or other transfer medium. After the bill has been written the two parts are separated along the fold or crease 129 and the part 128 is forwarded to the customer while the part 127 is preferably incorporated in a book which forms part of the records of the business, said part 127 being preferably provided with holes 130 for coöperation with pins or other retaining means in the record book.

At the beginning of the work the parts are positioned as shown in Figs. 1 and 3 and the free end of the carbon paper 112 is passed downwardly from the back of the roll through the opening or space 115 and into the grooves 116[b] in the chute. As the free end of the carbon is drawn downwardly through the chute by the operator with one hand, the other hand is used to turn the finger wheel 80 away from the operator, thereby communicating a rotary movement to the shaft 72, the main shaft 85 and from the latter through the stopping portion 102 and contact portion 103 to the nut 99 and thence the sleeve 88. In other words, by turning the finger wheel 80 as described the operator overcomes the friction of the spring 82 and enables the roll of carbon to be turned and the free end to be drawn downwardly through the chute without disturbing the normal relation between the traveling nut 99 and the stop 100 and without increasing the tension of the spring 106. The free end of the carbon paper is drawn downwardly until its leading edge passes out of the chute and over the paper table 36 and is brought into coöperation with the platen and the paper feed roller, the latter being preferably moved to and maintained in releasing position until the leading edge of the carbon paper has passed between said feed roller and the platen, whereupon the feed roller is allowed to return to operative position, clamping the leading edge portion of the carbon paper. It will be understood that in this operation the finger wheel 80 has been turned to such an extent that the leading edge of the carbon web is in position to be caught by the feed roll 27 when the stops 103 and 102 are in contact. One of the folded bill sheets may now be arranged in position for being fed into the machine. With its bottom uppermost and with the fold or crease 129 at the right, said bill sheet is brought into coöperation with the chute 116, the wider or record part 127 of the bill sheet being passed from left to right in front of the chute and between it and the part 123[a] of the guide wire, the bill proper or narrower part 128 passing behind the chute and between it and the rear part of the guide wire. The movement from left to right is continued until the fold or crease 129 engages with the right-hand edge of the chute, which edge is preferably at right angles to the axis of the platen so that the edge may serve as a side guide for the bill sheet and position it to be properly fed. The bill sheet is then slid down along the chute until its leading edge comes into coöperation with the feed roll 27. If now the platen be turned in line spacing direction the bill sheet and carbon paper will be fed around said platen together, the carbon as it leaves the chute being inclosed between the two parts of the bill sheet. It will be understood that when the bill sheet has been fed far enough forward for writing the first line, if the printing instrumentalities are actuated, they will coöperate with the part 128 through the usual inking ribbon so that the type impressions on the part 114 will be made from the ink on the ribbon while the type impressions on the part 127 will be made from the carbon 112. It will further be understood that during the line spacing operations through which the bill sheet passes, the lower portion of the carbon paper will be controlled by the platen and the feed roller and the roll holder will be turned to unroll more or less of the carbon paper from the roll. During the turning movements thus communicated to the roll holder 111 and the sleeve 88, the shaft or axle 85 will be held fixed by the friction spring 82. Consequently as the sleeve 88 turns it will communicate rotary movement to the traveling nut 99 and the latter will be screwed along the threaded portion of the shaft 85 which remains stationary. This movement of the traveling nut axially of the shaft 85 will carry said nut out of contact with the stopping portion 102 and away from the stop member 100 and will cause said nut to travel along the shaft toward the stop member 95 a distance depending on the amount of carbon paper unrolled during the line spacing operations. After the writing on the bill has been completed the platen may be turned in line space direction until the lower edge of the bill has been moved downwardly and forwardly past the feed roll 27. Of course, during this movement of the carbon paper the traveling nut 99 will be screwed along the threaded part of the shaft 85 still farther from the stop member 100 and nearer to the stop member 95. The latter is spaced so far from the stop member 100 that it will not be reached by the traveling nut during the writing of a bill sheet even of exceptional length. The stop member 95, however, serves a useful purpose in preventing the unscrewing of the nut from the shaft.

From a consideration of Fig. 3 it will be understood that during the turning movement of the sleeve 88, while the shaft 85 remains stationary the left-hand end of the spring 106 will remain stationary but the

right-hand end thereof, carried by the block 90, will be turned to wind up the spring and increase its tension. Initially, the spring 106 is adjusted to have sufficient tension to effect a rapid return movement of the parts even near the termination of such return movement. The initial tension may be regulated by removing the screw 89 so as to disconnect the bearing block 90 from the sleeve 88 and then effecting the proper adjustment between the bearing block and sleeve to give the desired amount of initial tension of the spring 106, after which the screw 89 may be replaced. This initial tension will be increased owing to the turning movement of the sleeve relatively to the shaft 85 under the influence of the line spacing movements communicated to the carbon paper by an amount depending on the amount of carbon paper unwound.

The bill having been fed forwardly past the feed roll 27 as above described, the operator may next grasp the upper portion of the bill sheet with the right hand, being careful not to take hold of the free end of the carbon paper, while with the left hand the feed roll release lever 37 is pulled forwardly to move the feed roll away from the platen. As soon as the releasing movement of the feed roll takes place the tension of the spring 106, communicated through the block 90 to the sleeve 88 and roll holder 111 will start automatically to rewind the carbon paper on the roll, turning the latter in the direction of the arrow in Fig. 6. During this rewinding movement the speed at which the roll holder turns will be regulated by the governing device comprising the pivoted arms 108 in the manner hereinbefore described. As the roll holder and the sleeve 88 turn backwardly under the influence of the returning spring 106 the traveling nut 99 will be turned backwardly also, the shaft 85 still remaining stationary, and said traveling nut will again move axially of said shaft but in the reverse of the former direction or from left to right and toward the stop member 100. The turning movements of the parts and the rewinding of the carbon paper will continue until the contact portion 103 on the traveling nut engages with the stopping portion 102 on the stop member 100. By providing the lug-like parts 103 and 102, I am enabled to effect a positive stoppage but without any binding action of the traveling nut 99 on the stop member 100 as might be the case were the flat opposite side faces of these two members permitted to contact with each other to effect a stoppage of the traveling nut and the other turning parts. It will be understood that when the part 103 engages with the stop 102 to arrest the traveling nut, and through it the roll holder, a considerable force is suddenly applied to the shaft 85 tending to turn said shaft in the direction in which the nut 99 is turned. To prevent the shaft from turning and changing its normal position I have constructed and arranged the spring 82 as shown and described, said spring serving as a friction clutch. This function of the spring will be understood from a consideration of Fig. 3. The force applied to the shaft 85 by the traveling nut is communicated to the short shaft 73 and tends to turn the latter also; but through the slot 83 this force is also communicated to the left end of the spring 82 with the result that the tendency of said spring to unwind is increased, and said spring is caused to bind more closely than before in the bore 72 and any motion of the parts is prevented. Since the return movement of the traveling nut along the shaft 85 from left to right is of the same extent as the first part of its movement from right to left along said shaft, the amount of carbon paper rewound will be the same as the amount unwound during the line space movements; and when the rewinding movement ceases the lower free end of the carbon will be in the position from which it started when the feeding of the bill sheet around with the platen was commenced. A second bill sheet may now be introduced, written upon and fed through the machine as before, the same portion of the carbon paper again being used to reproduce the type impressions on the record portion of the new bill sheet. Thereafter the carbon paper may be automatically restored to the first position by again operating the feed roll release lever in the manner above described.

The operations outlined above may be repeated with a plurality of succeeding bill sheets until the lower portion of the carbon paper becomes exhausted from use. When this occurs the carbon paper may be drawn forwardly around the platen until the used portion or section has entirely passed out of the machine, whereupon it may be severed by any suitable means. If, now, the feed roll release lever be operated, the spring 106 will act to rewind the carbon paper until its lower free end will have been drawn backwardly around the platen and up through the chute a distance from the feed roller equal to the length of the used portion of the carbon paper, which has been severed or cut away. Before introducing the next succeeding bill sheet, the finger wheel 80 may be turned rearwardly as before by the operator and the carbon paper drawn downward through the chute again until its free end is in position for coöperation with the paper feeding devices and the platen.

If desired, instead of feeding the bill sheet forwardly after the writing on it has been completed and prior to bringing the automatic returning means into action, the latter may instead be caused to operate as soon as the writing on the bill sheet has been

finished with the result that said bill sheet will be drawn backward with the carbon paper to the starting point and may be removed from the machine behind the platen instead of being fed forward and removed from the front. This second method is perhaps to be preferred when the upper portion only of the bill sheet is written upon.

When the roll of carbon paper has become exhausted, the plunger 68 may be retracted and the shaft 85 carrying the roll holder may be removed from the machine. Then the roll holder 111 may be slipped off the sleeve 88 and replaced by another roll holder carrying a fresh roll of carbon paper, after which the roll holder may be replaced, the cross-pin 87 on the shaft 85 being caused to reëngage with the cross slot 76 and the reduced end 86 of the shaft reëngaging with the bearing opening in the plunger 68.

The clutching device comprising the friction spring 82 does not interfere with the manual turning of the finger wheel 80 backwardly as has been seen. The construction is also such that the forward turning movement of said finger wheel and of the carbon roll holder, is not prevented. The slot 84 in which the right-hand end of the spring 32 engages is of considerably greater width than the diameter of said spring and normally, as will be apparent from a consideration of Fig. 3, the end of the spring will, because of the tendency of the latter to unwind, engage with the side of the slot 84 which is uppermost in Fig. 3 and will maintain the end of the slot 78 which is lowermost in said Fig. 3 in contact with the pin 77. When it is desired to turn the finger wheel 80 and the carbon roll forwardly, said finger wheel will be turned a distance equal to the length of the slot 78 before any turning movement is communicated to the shafts 73 and 85. During this independent turning movement of the finger wheel 80 the side of the slot 84 will coöperate with the engaged right end of the spring 82 to wind up the latter sufficiently to prevent any clutching or binding movement sufficient to hold the shafts 73 and 85 from turning.

When it becomes necessary, in the course of the work, to inspect the line being written, the lifting member 23 is raised to rock the platen forwardly in the usual manner from the position shown in full lines in Fig. 1 to the position indicated diagrammatically by the dotted lines in the same figure. During this forward rocking movement of the platen, the platen frame will be swung about its pivots 19 and the casing, roll holder and chute will be swung downwardly and forwardly to the positions indicated by the dotted lines in Fig. 1. During the downward and forward movements of the roll holder casing, the crank arms 55 will swing downwardly, turning the rock shaft 53 in its bearings while, at the same time, the casing will have a further turning movement on its own axis in the ring-like parts 58 on the crank arms. During this movement the tension of the spring 66 at the left of the casing is increased. The combined swinging movement thus communicated to the casing is brought about from its connection with the platen frame through the chute 116. The lower end of the chute is swung forwardly with the platen frame, the pivotal connection between the two permitting an easy change in the relations of the parts. In the new position of the chute it will be seen that it is substantially tangential of the platen at the rear thereof as it was also in normal position. This arrangement prevents rumpling or buckling of the carbon paper during back and forth rocking movements of the platen.

Certain of the features herein shown and described are not claimed by me in their broader aspects as they are the invention of Harry I. Seddon and form the subject-matter of his application above referred to.

Various changes may be made in the details of construction and arrangement without departing from my invention.

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

1. In a typewriting machine, the combination of a material-carrying device, paper controlling devices operative to control the material on said material-carrying device, means for automatically returning the material to said material-carrying device when released from said paper controlling devices, and means for regulating automatically and independently of the material the speed at which said material is returned.

2. In a typewriting machine, the combination of a material-carrying device, paper feed devices operative when actuated to draw the material from said material-carrying device, means for releasing the material from said paper feed devices, means for returning the material to said material-carrying device when released from said paper feed devices, and means for regulating automatically of the material the speed at which said material is returned.

3. In a typewriting machine, the combination of a rotary material-carrying device, a rotary platen, means for enabling the platen, as it is turned, to unwind the material, means for causing said material-carrying device to rotate automatically to rewind the material when it is released from the control of the platen, and means for regulating and controlling automatically and independently of the material the speed of the automatic rotary movements of said material-carrying device.

4. In a typewriting machine, the combination of a rotary material-carrying device, a rotary platen, means for enabling the platen, as it is turned, to unwind the material, means for causing said material-carrying device to rotate automatically to rewind the material when it is released from the control of the platen, means for controlling the parts so that the amount of material rewound shall be equal substantially to the amount unwound during the turning movements of the platen, and means for regulating automatically and independently of the material the speed of the material-carrying device during the rewinding movements thereof.

5. In a typewriting machine, the combination of a material-carrying device, paper feed devices operative to control the material on said material-carrying device, means for automatically returning the material to said material-carrying device when released from said paper feeding devices, and means for regulating the speed at which said material is returned, said last recited means comprising a plurality of pivoted members or weights and a part with which said weights are frictionally coöperative.

6. In a typewriting machine, the combination of a material-carrying device, paper feed devices operative to control the material on said material-carrying device, means for automatically returning the material to said material-carrying device when released from said paper feeding devices, and means for regulating the speed at which said material is returned, said last recited means comprising a pair of parallel plates or flanges, a plurality of weights pivoted on and between said flanges, and a relatively fixed part with which said weights are operative to frictionally engage.

7. In a typewriting machine, the combination of a shaft, a roll holder rotatably mounted thereon, a spring between said shaft and said roll holder operative to effect a relative rotary movement between them, and means for automatically regulating the speed of said relative rotary movement.

8. In a typewriting machine, the combination of a shaft, a roll holder rotatably mounted thereon, a spring between said shaft and said roll holder operative to effect a relative rotary movement between them, and means for automatically regulating the speed of said relative rotary movement, said means comprising a pair of plates or flanges spaced apart and fixed relatively to said roll holder, and weights pivoted between said flanges and operative to engage frictionally the inner surface of a casing inclosing them.

9. In a typewriting machine, the combination of a shaft, a friction spring for maintaining the shaft in normal position, a finger wheel for manually varying the normal position of said shaft, a roll holder mounted on said shaft, and a spring between said shaft and said roll holder, said spring being operative to effect an automatic rotary movement of said roll holder on said shaft to rewind the material on said roll holder.

10. In a material-carrying and winding mechanism, the combination of a rotary material-carrying device, a support therefor, means operative to automatically rotate said device to rewind the material after it has been drawn off by hand, a friction clutch operative to positively arrest said material-carrying device at the end of the rewinding movement, and a finger wheel operative to render said clutch inoperative and to turn said device.

11. In a material-carrying and winding mechanism, the combination of a rotary material-carrying device, a support therefor, a spring operative to automatically rotate said device to rewind the material after it has been drawn off by hand, a friction spring operative to positively arrest said device at the end of the rewinding movement, and a finger wheel operative to render said friction spring inoperative and to turn said device at will in either direction.

12. In a material-carrying and winding mechanism, the combination of a material-carrying device, means operative to automatically rotate said device to rewind the material after it has been drawn off by hand, a friction spring connected at one end with said device, and a finger wheel with which the other end of said friction spring is connected, said friction spring serving as a positive clutch to prevent overthrow of said device during the automatic rewinding movements thereof and said finger wheel being operative to overcome the positive clutching effect of said friction spring.

13. In a material-carrying and winding mechanism, the combination of a rotary material-carrying device, means operative to automatically rotate said device to rewind the material after it has been drawn off by hand, a coiled expansible friction spring, a part within which said spring is coiled, one end of said spring being connected with said material-carrying device and said spring tending to expand and thereby serving as a positive clutch to arrest said material-carrying device during rewinding movements thereof, a finger wheel connected with the other end of said spring, said finger wheel operating to wind said spring and enabling said material-carrying device to be turned by hand at will.

14. In a material-carrying and winding mechanism, the combination of a roll holder, a friction spring for maintaining said roll holder in normal position, a finger wheel for manually varying the normal position of said roll holder, and a main spring operative to

effect an automatic rotary movement of said roll holder to rewind the material thereon, said finger wheel having a lost motion connection with said friction spring so that the friction of said friction spring may be reduced when the roll holder is turned in one direction by the finger wheel.

15. In a material-carrying and winding mechanism, the combination of a roll holder, a friction spring for maintaining said roll holder in normal position, a finger wheel for manually varying the normal position of said roll holder, and a main spring operative to effect an automatic rotary movement of said roll holder to rewind the material thereon, said finger wheel having a lost motion connection with said roll holder so that the friction of said friction spring may be reduced as the finger wheel is turned in one direction before the roll holder is taken up by said finger wheel.

16. In a material-carrying and winding mechanism, the combination of a roll holder, a friction spring for maintaining said roll holder in normal position, a finger wheel for manually varying the normal position of said roll holder, and a main spring operative to effect an automatic rotary movement of said roll holder to rewind the material thereon, said finger wheel having a lost motion connection with said friction spring and a lost motion connection with said roll holder so that the friction of said friction spring is reduced when said roll holder is turned in either direction by said finger wheel.

17. In a material-carrying and winding mechanism, the combination with a roll-holder and a rewinding spring therefor, of a finger wheel for adjusting said spring, a clutch for holding said spring in adjusted position, said clutch comprising a coiled friction device, and a finger wheel for adjusting said spring, said finger wheel having connection with both ends of said friction device whereby when said finger wheel is turned in either direction it loosens said friction device.

18. In a typewrting machine, the combination of a shaft, a friction spring for maintaining the shaft in normal position, a finger wheel for manually varying the normal position of said shaft, a roll holder mounted on said shaft, and a spring between said shaft and said roll holder, said spring being operative to effect an automatic rotary movement of said roll holder on said shaft to rewind the material on said roll holder, said finger wheel having a lost motion connection with said friction spring so that the friction of said friction spring may be reduced when the shaft is turned by the finger wheel in one direction.

19. In a typewriting machine, the combination of a shaft, a friction spring for maintaining the shaft in normal position, a finger wheel for manually varying the normal position of said shaft, a roll holder mounted on said shaft, and a spring between said shaft and said roll holder, said spring being operative to effect an automatic rotary movement of said roll holder on said shaft to rewind the material on said roll holder, said finger wheel having a lost motion connection with said shaft so that the friction of said friction spring may be reduced as the finger wheel is turned in one direction before the shaft is taken up by said finger wheel.

20. In a typewriting machine, the combination of a shaft, a friction spring for maintaining the shaft in normal position, a finger wheel for manually varying the normal position of said shaft, a roll holder mounted on said shaft, and a spring between said shaft and said roll holder, said spring being operative to effect an automatic rotary movement of said roll holder on said shaft to rewind the material on said roll holder, said finger wheel having a lost motion connection with said friction spring and a lost motion connection with said shaft so that the friction of said friction spring is reduced when said shaft is turned in either direction by said finger wheel.

21. In a typewriting machine, the combination of a roll holder casing, shaft supports thereon, a main shaft detachably mounted on said supports, said supports including a short shaft normally connected with said main shaft, a friction spring surrounding said short shaft and frictionally engaging the bearing thereof, a finger wheel connected with said short shaft and operative to turn said main shaft, a roll holder rotatable on said main shaft, and a restoring spring between said main shaft and said roll holder, said restoring spring being operative to turn said roll holder to rewind the material thereon.

22. In a typewriting machine, the combination of a roll holder casing, shaft supports thereon, a main shaft detachably mounted on said supports, said supports including a short shaft normally connected with said main shaft, a friction spring surrounding said short shaft and frictionally engaging the bearing thereof, a finger wheel connected with said short shaft and operative to turn said main shaft, a roll holder rotatable on said main shaft, and a restoring spring between said main shaft and said roll holder, said restoring spring being operative to turn said roll holder to rewind the material thereon, said finger wheel having a lost motion connection both with said short shaft and with said friction spring whereby when said main shaft is turned by said finger wheel the friction of said friction spring is reduced.

23. In a typewriting machine, the combination of a roll holder casing, a shaft journaled therein, a friction spring for maintaining said shaft in normal position, a sleeve provided with bearing blocks coöperative with said shaft, a roll holder frictionally mounted on said sleeve, and a spring connected at one end with said shaft and at the other end with one of said bearing blocks, said spring being normally under initial tension, the bearing block with which said spring is connected being adjustable to vary the initial tension of said spring.

24. In a typewriting machine, the combination of a shaft, means for maintaining it in normal position, a sleeve rotatable on said shaft, a spring connecting said sleeve with said shaft and normally under initial tension, a roll holder mounted on said sleeve, and means for maintaining said shaft and said sleeve in unvarying normal relation, said last named means comprising a traveling member or nut on said shaft and connected with said sleeve.

25. In a typewriting machine, the combination of a shaft, means for maintaining it in normal position, a sleeve rotatable on said shaft, a spring connecting said sleeve with said shaft and normally under initial tension, a roll holder mounted on said sleeve, and means for maintaining said shaft and said sleeve in unvarying normal relation, said last recited means comprising a stop member fixed to said shaft and a traveling nut mounted on said shaft and slidably connected with said sleeve.

26. In a typewriting machine, the combination of a shaft, means for maintaining it in normal position, a sleeve rotatable on said shaft, a spring connecting said sleeve with said shaft and normally under initial tension, a roll holder mounted on said sleeve, and means for maintaining said shaft and sleeve in unvarying normal relation, said last recited means comprising a traveling nut mounted on and having a threaded connection with said shaft, said traveling nut having a sliding connection with said sleeve.

27. In a typewriting machine, the combination of a shaft, means for maintaining it in normal position, a sleeve rotatable on said shaft, a spring connecting said sleeve with said shaft and normally under initial tension, a roll holder mounted on said sleeve, and means for maintaining said shaft and said sleeve in unvarying normal relation, said means comprising a traveling nut mounted on a threaded part of said shaft and within said sleeve, said nut being provided with a depression or groove which cooperates with a longitudinal depression in said sleeve whereby said nut and said sleeve are slidably connected.

28. In a typewriting machine, the combination of a shaft; means for maintaining it in normal position; a sleeve rotatable on said shaft; a spring connecting said sleeve with said shaft and normally under initial tension; a roll holder mounted on said sleeve; means for maintaining said shaft and said sleeve in unvarying normal relation, said last recited means comprising a traveling nut and a stop member with which said nut normally coöperates; and a second stop member with which said traveling nut is adapted to coöperate when the roll holder has been turned to unwind the material therefrom.

29. In a typewriting machine, the combination of a shaft, means for maintaining it in normal position, a sleeve rotatable on said shaft, a spring connecting said sleeve with said shaft and normally under initial tension, a roll holder mounted on said sleeve, and means for maintaining said shaft and said sleeve in unvarying normal relation, said last recited means comprising a stop member having a stopping portion and a traveling nut having a contact portion coöperative with the stopping portion of said stop member.

30. In a typewriting machine, the combination of a shaft having a normal position variable at will, a sleeve surrounding said shaft, a bearing block fixed to said sleeve at one end and bearing on said shaft, a bearing block fixed to said sleeve at the other end, a bushing adjustable on said shaft and on which said last recited bearing block bears, a spring between said shaft and said sleeve and operative to effect a relative rotary movement between them, and devices within said sleeve for determining the normal relation between said sleeve and said shaft.

31. In a typewriting machine, the combination of a carriage movable in letter space direction, a platen frame carrying a platen, said platen frame being mounted on the carriage and shiftable thereon transversely of the direction of letter space feed movement, a roll holder on the carriage, a connection between said roll holder and said platen frame, and means tending constantly to maintain said roll holder and said platen frame in normal relation.

32. In a typewriting machine, the combination of a carriage, a platen frame pivotally mounted thereon and carrying a platen, a roll holder on the carriage, a pivotal connection between said roll holder and said platen frame, and a spring tending constantly to maintain said roll holder and said platen frame in normal relation.

33. In a typewriting machine, the combination of a carriage movable in letter space direction, a platen frame carrying a platen, said platen frame being mounted on said carriage and shiftable thereon transversely of the direction of letter space feed movement, a roll holder, a frame in which said

roll holder is rotatably mounted, said frame being mounted on the carriage, a pivotal connection between said roll holder and said platen frame, and a spring tending constantly to maintain said roll holder and said platen frame in normal relation.

34. In a typewriting machine, the combination of a carriage movable in letter space direction, a platen frame carrying a platen and shiftable on said carriage transversely of the direction of letter space feed movement, a roll holder, a frame on which said roll holder is pivotally supported, said frame being mounted on the carriage, a chute connecting said roll holder and said platen frame, and a spring tending constantly to maintain said roll holder, said chute and said platen frame in normal relation.

35. In a typewriting machine, the combination of a carriage, a rocker platen thereon, a chute or guide way for paper or the like, said chute being arranged above and at the rear of the platen and being so connected with said platen that said chute is substantially tangential of said platen in either of the positions to which it may be rocked, and a spring tending constantly to maintain said chute in normal position.

36. In a typewriting machine, the combination of a carriage, a platen frame pivotally mounted thereon so that the platen may be raised to a non-printing position, a platen in said frame, a roll holder, a chute or guide way between said roll holder and said platen, said chute being pivotally connected with said platen frame and being substantially tangential of the platen in both the normal and raised positions of the latter, and a spring tending constantly to maintain said chute in normal position.

37. In a typewriting machine, the combination of a carriage, a platen frame pivoted thereon and carrying a platen, a support on said carriage, a frame or casing pivotally mounted on said support, a roll holder rotatable in said frame or casing, a chute or guide way rigid with said frame or casing and pivotally connected with said platen frame, and a spring tending constantly to maintain said frame or casing in normal relation with said platen frame.

38. In a typewriting machine, the combination of a carriage, a platen frame pivoted thereon and carrying the platen, a frame comprising V-shaped arms rising from said carriage and supporting a rock shaft, a casing or frame supported on said rock shaft, a roll holder rotatably mounted in said casing, a chute or guide way fixed to said casing and pivoted to said platen frame, said chute extending forwardly and downwardly in a plane substantially tangential of the platen at the rear thereof, and a spring tending constantly to maintain said chute in normal relation with said platen.

39. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support or frame detachably secured on said carriage and comprising a pair of inverted V-shaped arms, a rock shaft journaled at the upper part of said support or frame and carrying crank arms, a casing or frame journaled on said crank arms, a roll holder supported in said casing, and a pivotal connection between said casing and said platen frame.

40. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support or frame detachably secured on said carriage and comprising a pair of inverted V-shaped arms, a rock shaft journaled at the upper part of said support or frame and carrying crank arms, a casing or frame journaled on said crank arms, a roll holder journaled in said casing, the axis of said roll holder and the pivotal axis of said casing being coincident, and a pivotal connection between said casing and said platen frame.

41. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support or frame detachably secured on said carriage and comprising a pair of inverted V-shaped arms, a rock shaft journaled at the upper part of said support or frame and carrying crank arms, a casing or frame journaled on said crank arms, a roll holder journaled in said casing, the axis of said roll holder and the pivotal axis of said casing being coincident, a pivotal connection between said casing and said platen frame, and a spring tending constantly to maintain said casing in normal position.

42. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support or frame detachably secured to said carriage and comprising a pair of inverted V-shaped arms, bearing blocks at the upper portion of said support or frame, a rock shaft journaled in said bearing blocks, crank arms fixed on said rock shaft and provided with bearing openings, a frame or casing journaled in said bearing openings, a roll holder pivotally mounted in said casing, the axis of said roll holder and the pivotal axis of said casing in said crank arms being coincident, a chute connected with said casing, and a pivotal connection between said chute and said platen frame.

43. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support or frame detachably secured to said carriage and comprising a pair of inverted V-shaped arms, bearing blocks at

the upper portion of said support or frame, a rock shaft journaled in said bearing blocks, crank arms fixed on said rock shaft and provided with bearing openings, a casing provided with hubs which bear in the openings in said crank arms, a spring between said casing and one of said crank arms tending to maintain the parts in normal relation, a roll holder journaled in said casing, a chute fixed to said casing, and a pivotal connection between said chute and said platen frame.

44. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and carrying a platen, a support rising from said carriage, a frame-like part on said support, a roll holder journaled on said frame-like part, and a pivotal connection between said frame-like part and said platen frame, said pivotal connection comprising a bracket, and a detachable pin supported on said bracket and coöperating with said frame-like part.

45. In a typewriting machine, the combination of a carriage, a platen frame pivotally connected therewith and supporting a platen, a paper table on said platen frame, a support rising from said carriage, a frame-like part on said support, a roll holder journaled on said frame-like part, and a pivotal connection between said frame-like part and said platen frame, said pivotal connection comprising a bracket detachably secured to said paper table and provided with forwardly extending ears, and a pin frictionally secured in said ears, and engaging an opening in said frame-like part.

46. In a typewriting machine, the combination of a carriage, a platen mounted thereon, a support or frame on said carriage, a roll holder journaled on said support, a chute or guide way for the paper or other material carried by said roll holder, said chute being arranged between said roll holder and said platen, and a guide wire secured on said support and coöperative with the front and back of said chute to guide the work sheet.

47. In a typewriting machine, the combination of a carriage, a platen mounted thereon, a support or frame on said carriage, a roll holder journaled on said support, a chute or guide way for the paper or other material carried by said roll holder, said chute being arranged between said roll holder and said platen, and a guide wire bent to form guiding mouths or pockets at the front and back of the chute to guide the paper to be written on.

48. In a typewriting machine, the combination of a carriage, a platen mounted thereon, a support or frame on said carriage, a roll holder journaled on said support, a chute or guide way for the paper or other material carried by said roll holder, said chute being arranged between said roll holder and said platen, a guide wire secured on said support and coöperative with the work sheet, and a guide wire secured at the front of the carriage and coöperative with both the work sheet and the carbon paper or other material as they are fed out of the machine.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 30th day of October A. D. 1906.

HANNIBAL C. FORD.

Witnesses:

E. F. JONES,

C. G. WHITE.