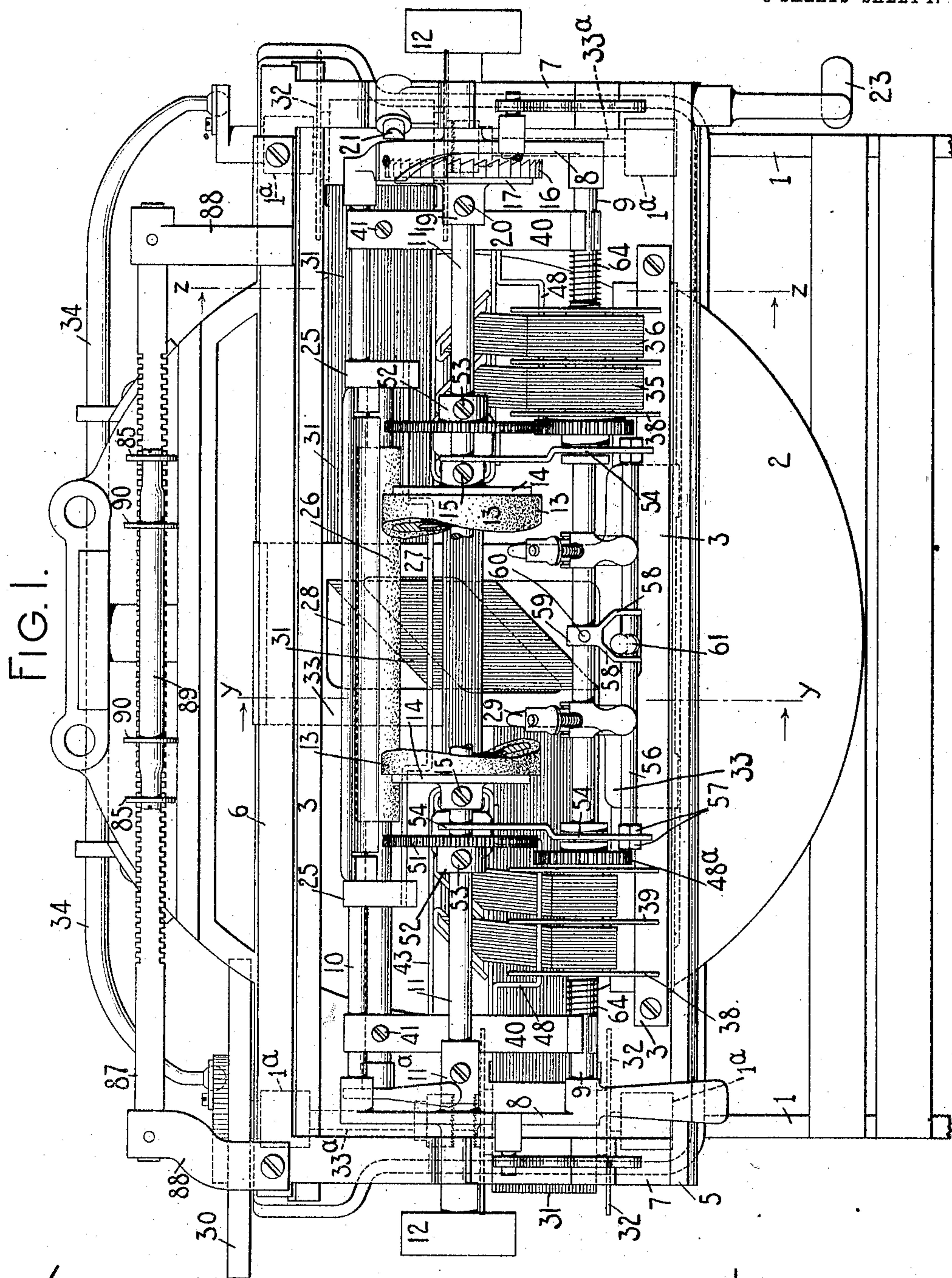


J. Z. GLENZING.
TYPE WRITING MACHINE.
APPLICATION FILED AUG. 22, 1908.

983,358.

Patented Feb. 7, 1911.

6 SHEETS—SHEET 1.



WITNESSES:

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J. B. Reeves.

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5 SHEETS—SHEET 2.

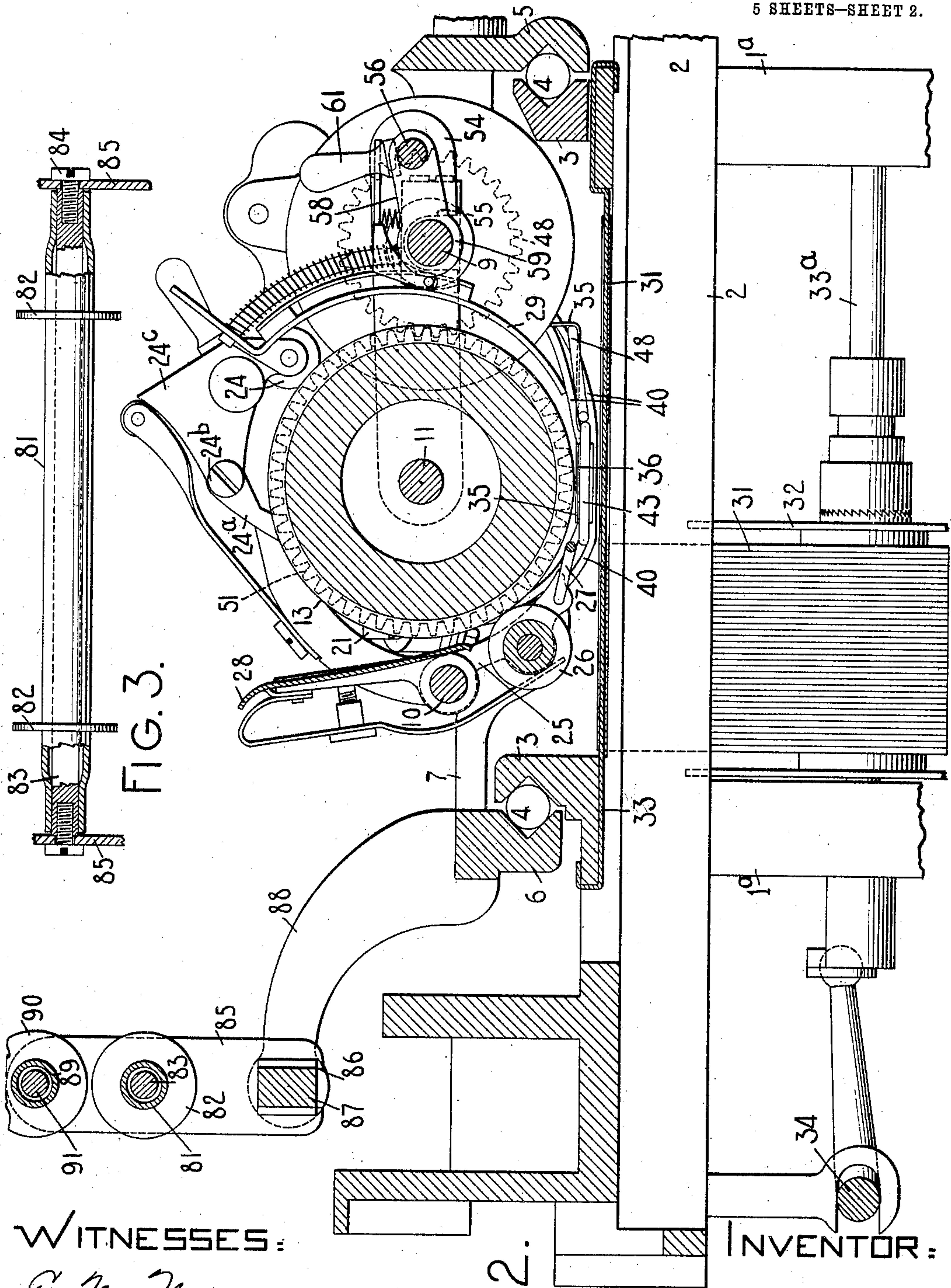


FIG. 3.

FIG. 2.

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5 SHEETS—SHEET 3.

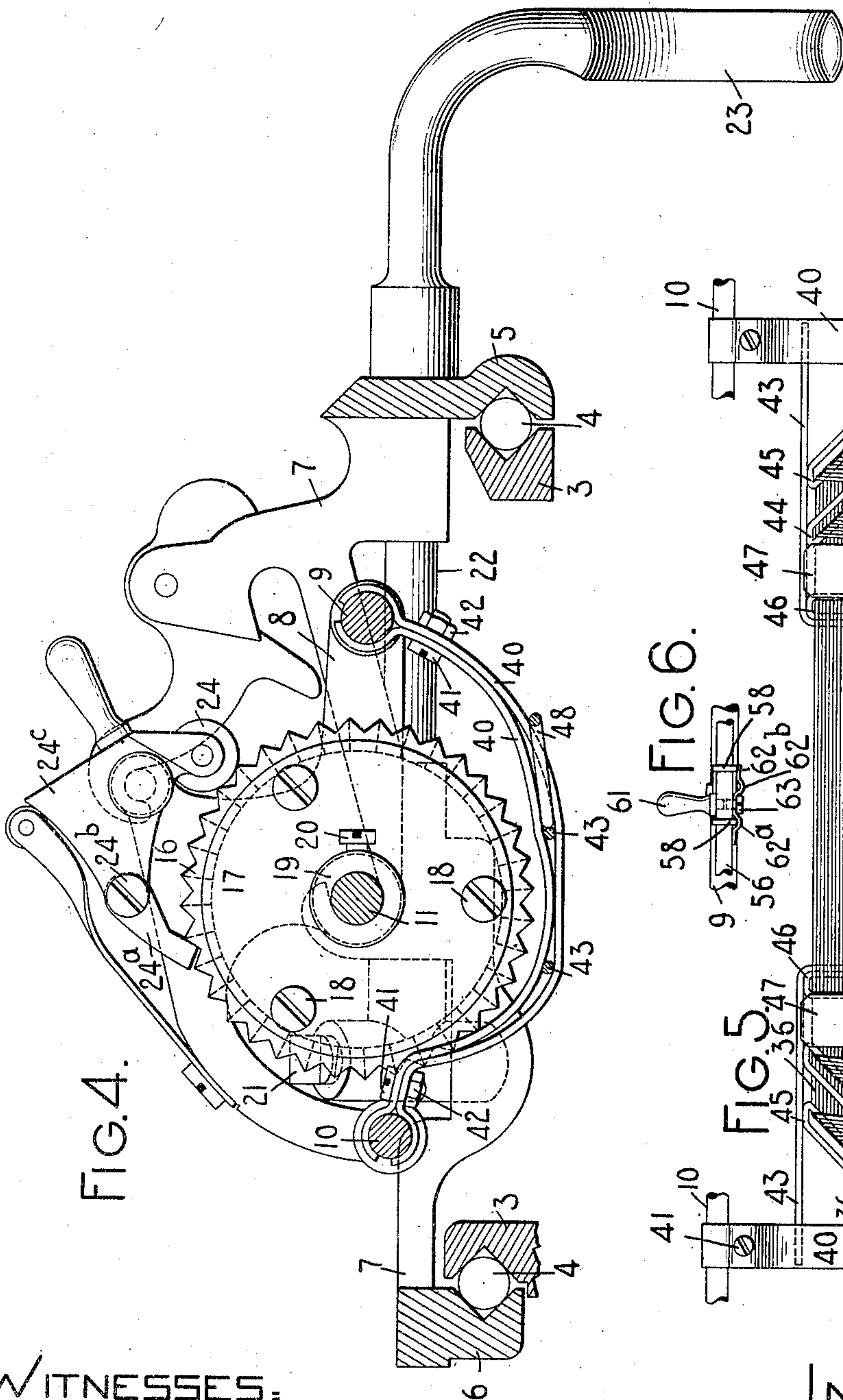


FIG. 4.

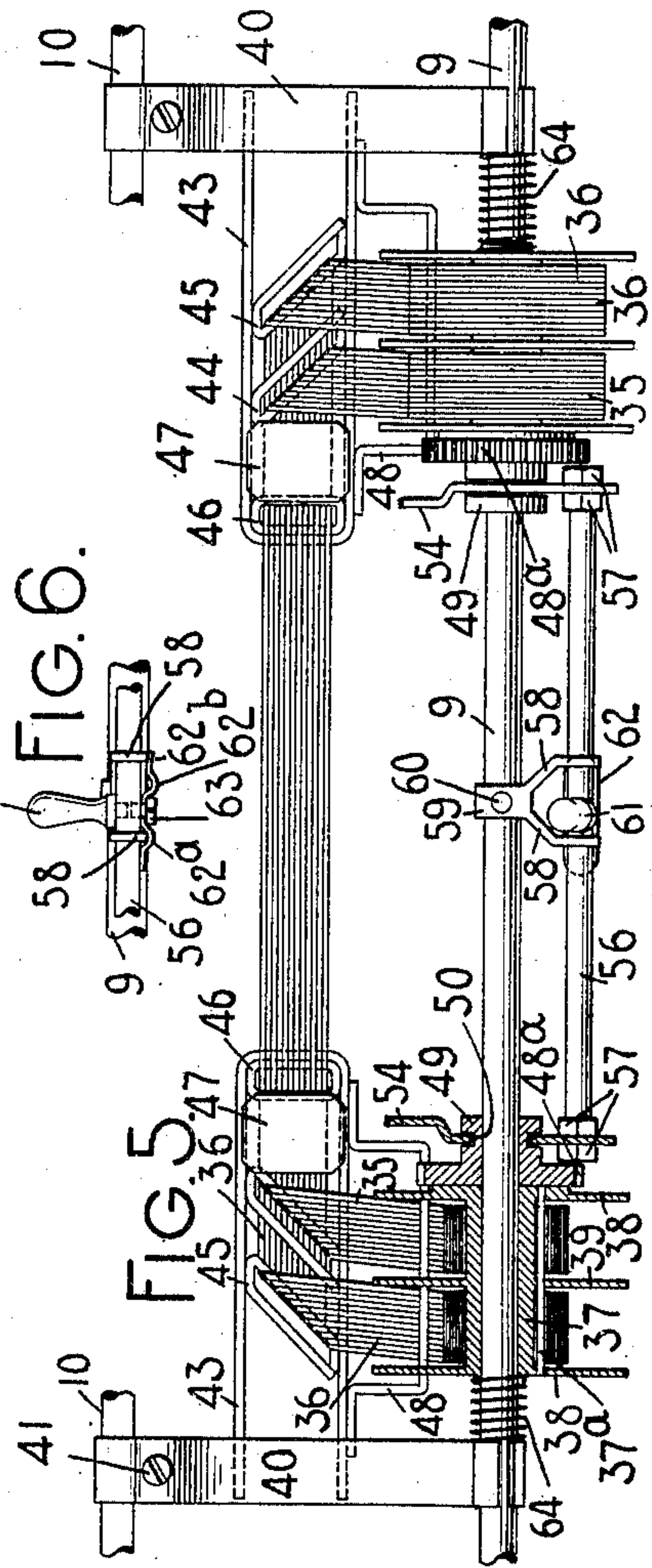


FIG. 5.

FIG. 6.

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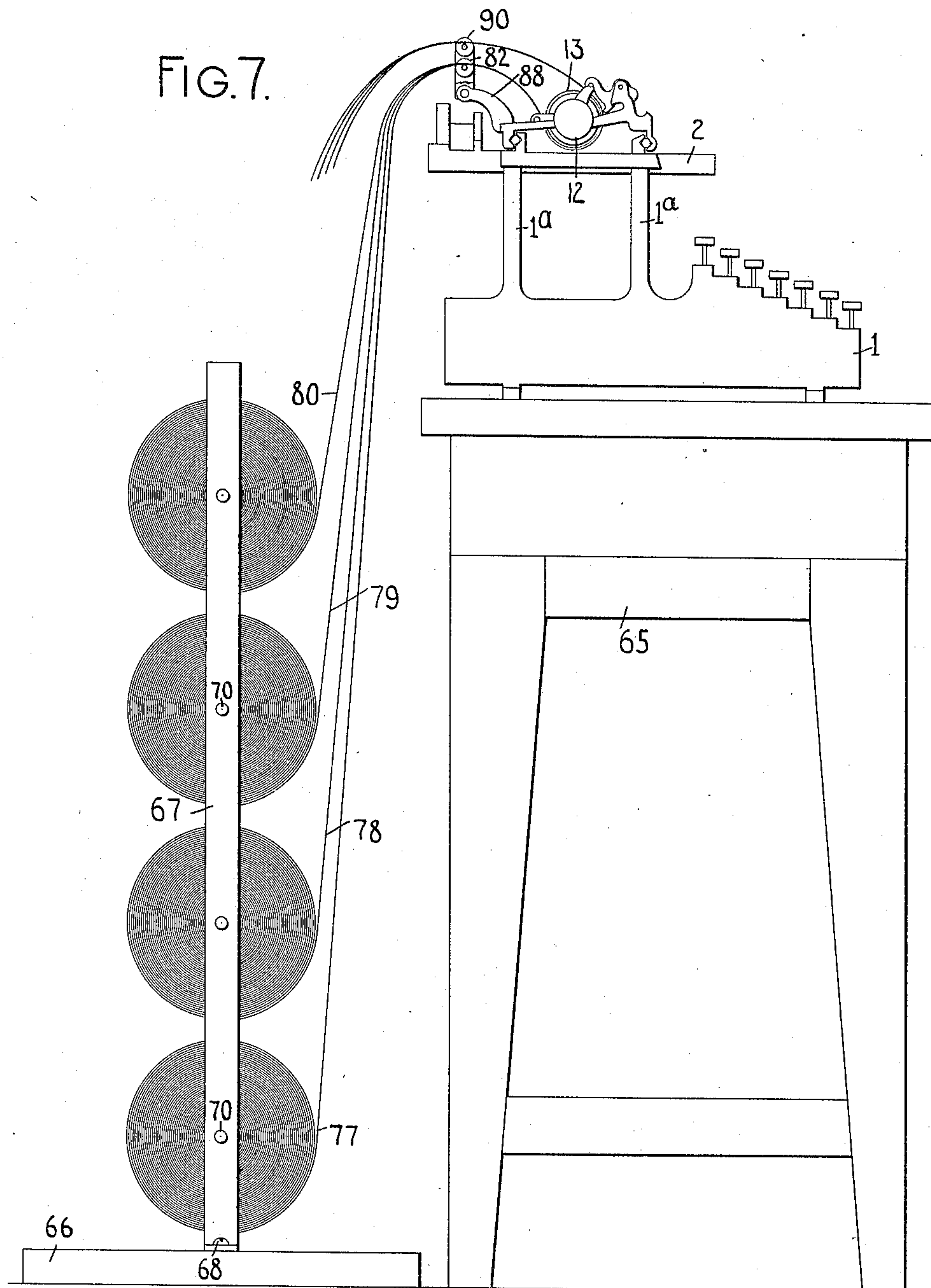
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983,358.

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5 SHEETS—SHEET 4.



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TYPE WRITING MACHINE.
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983,358.

Patented Feb. 7, 1911.

6 SHEETS—SHEET 5.

FIG. 9.

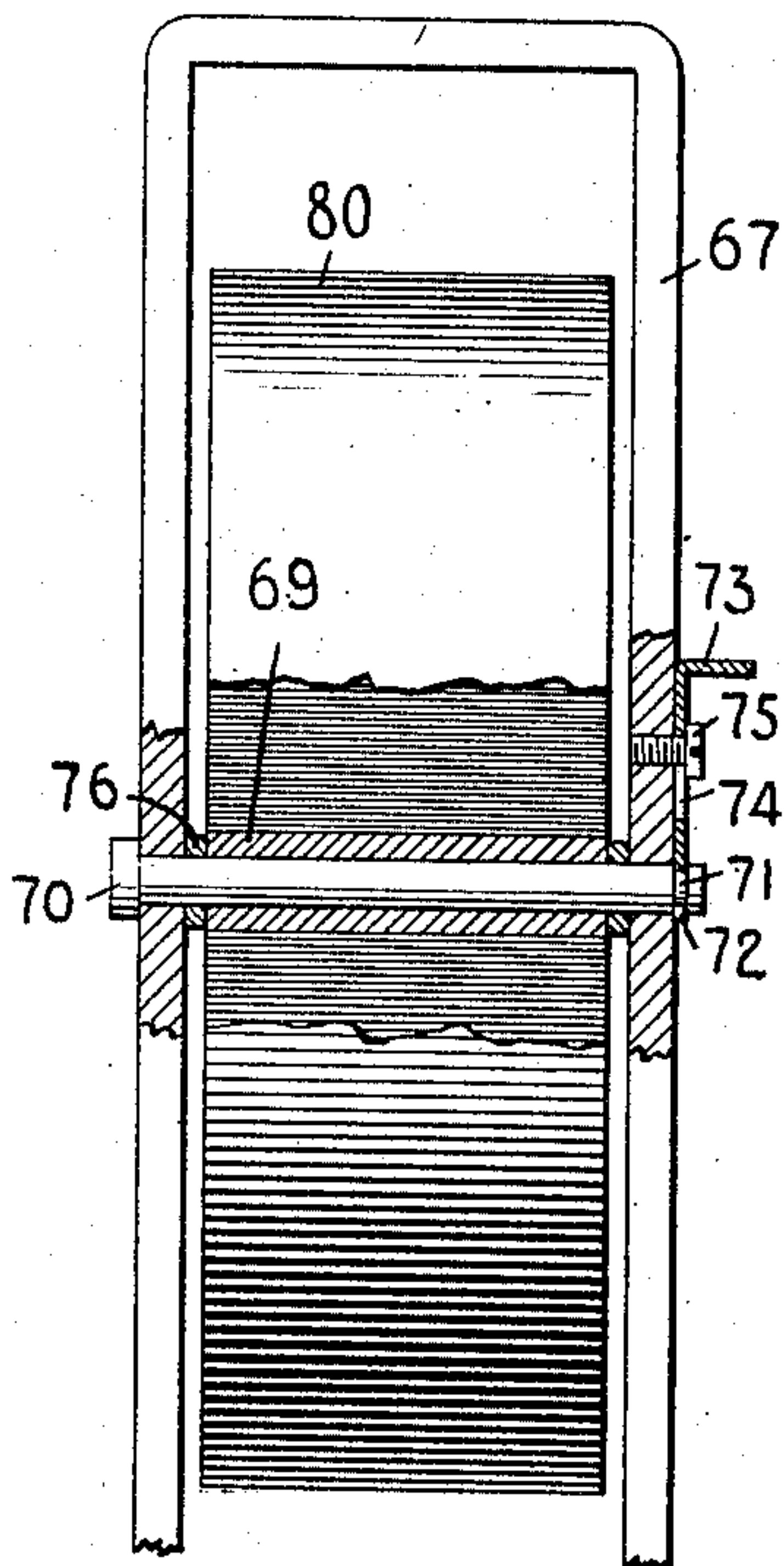


FIG. 10.

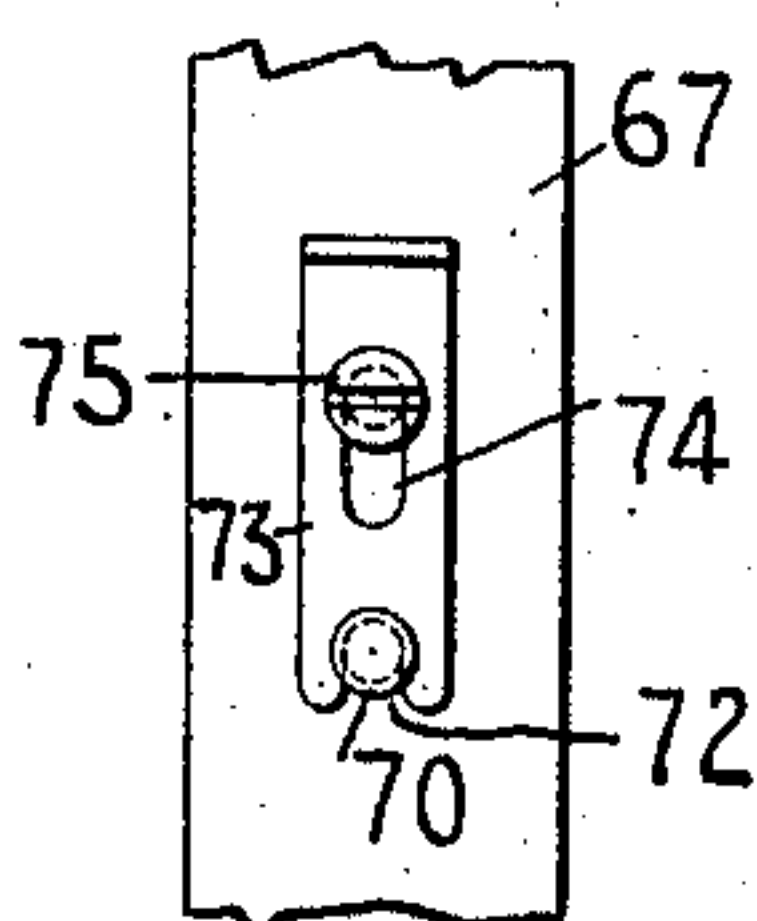
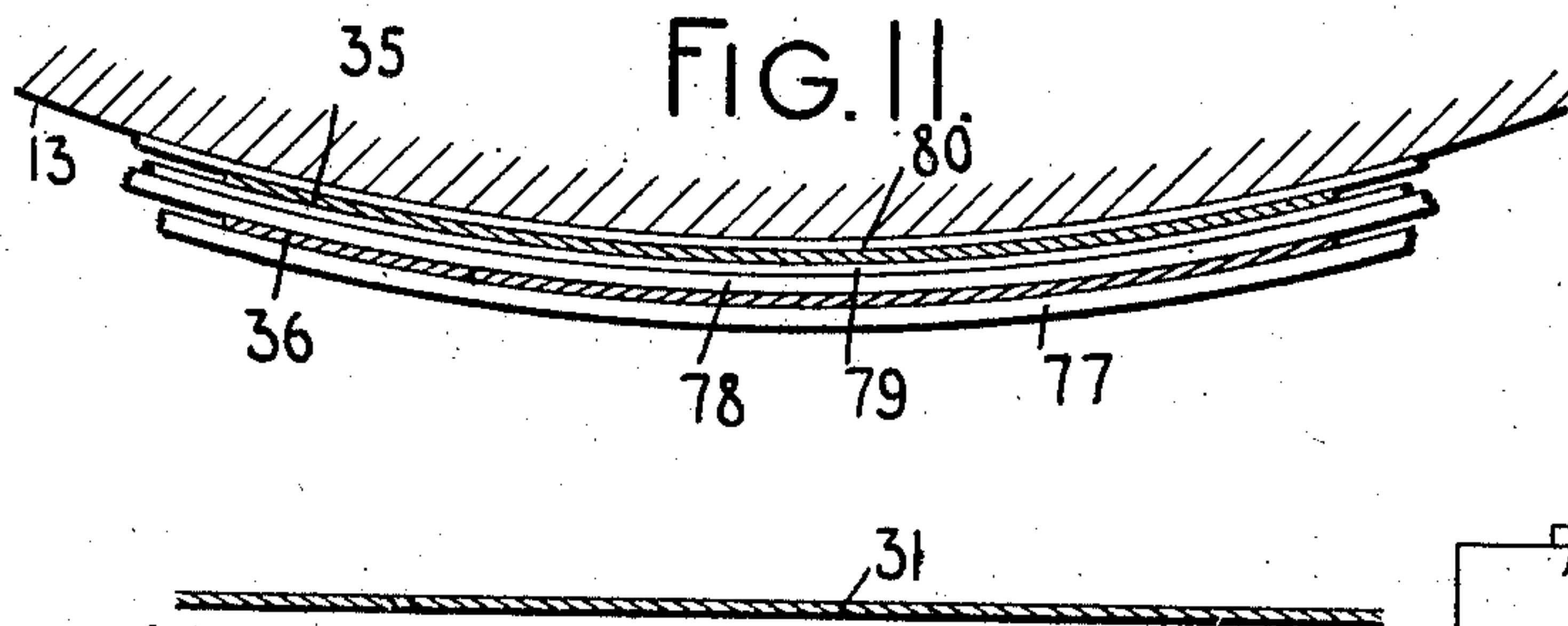
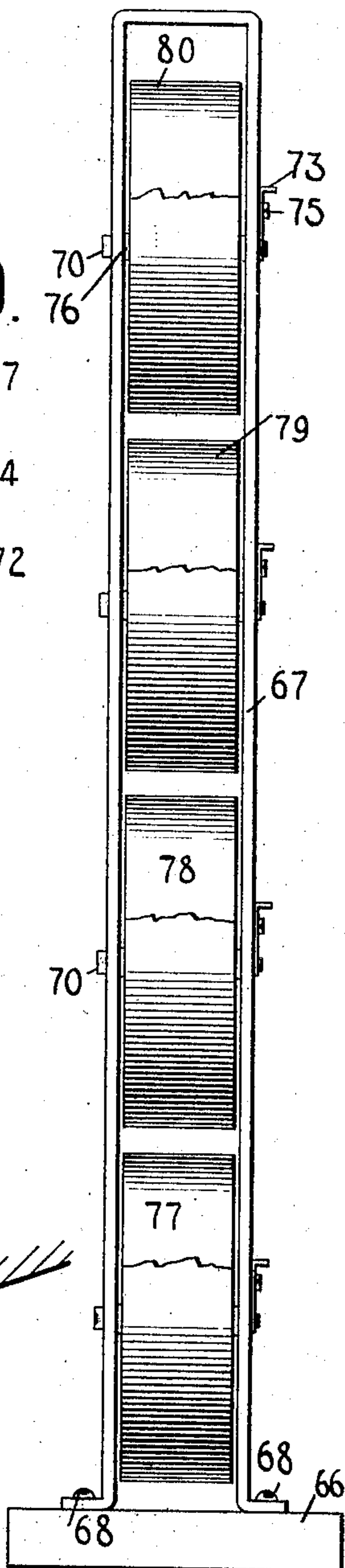


FIG. 8.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN Z. GLENZING, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE SMITH PREMIER TYPEWRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

983,358.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed August 22, 1908. Serial No. 449,793.

To all whom it may concern:

Be it known that I, JOHN Z. GLENZING, citizen of the United States, and resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and its main object is to provide improved mechanism for producing at a single operation a plurality of inked copies of the work.

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

The present embodiment of my invention is more especially adapted for writing lists of addresses or the like.

A portable support is arranged at the rear of the typewriter cabinet or table, said support carrying in the present instance four rolls of paper, the free ends whereof are directed upward and over a guide on the platen carriage, and thence fed around the platen. Two auxiliary ribbons are mounted on spools carried by the paper carriage, said ribbons extending lengthwise of the platen over the printing point and being interleaved with the strips or ribbons of paper drawn from the rolls. In the present instance two of these paper strips are of ordinary paper and two are thin tissue, the ordinary strips being lowermost, one passing between the usual inking ribbon and the outermost auxiliary ribbon. The other ordinary strip, together with one of the tissue strips, passes between the two auxiliary ribbons and the second tissue strip passes between the platen and the contiguous auxiliary ribbon. This arrangement enables four original or first copies to be written at once. In the particular system for which the present mechanism was designed, one of the copies on ordinary paper is intended to be pasted on the magazine or pamphlet which is to be mailed, the second copy on ordinary paper is a reserve copy to be used in case of emergency. One of the tissue copies may be used for comparison or as a check, being compared with the original address which

was filed away, and the second tissue copy is preserved in a safe place, as long at least as the subscriptions run of those whose names appear on it.

The present invention is shown as applied to a Smith Premier typewriter and while it was designed for use in the particular manner described, it is nevertheless to be understood that it may be adapted to other styles of machines and may be used in a different way or ways and that parts of it may be employed without other parts.

In the drawings:—Figure 1 is a fragmentary top plan view of a Smith Premier typewriting machine showing my invention applied thereto, the platen being broken away. Fig. 2 is a vertical sectional view taken on a plane represented by the dotted line $y-y$ of Fig. 1 and looking in the direction of the arrows at said line. Fig. 3 is a detail view, partly in section, of a part hereinafter termed a guide or guide-roller and its support. Fig. 4 is a vertical sectional view taken on a plane represented by the dotted line $z-z$ in Fig. 1 and looking in the direction of the arrow at said line. Fig. 5 is a fragmentary vertical top plan view, partly in section, showing the auxiliary ribbons with their supports and guides and part of the feeding mechanism of said ribbons. Fig. 6 is a fragmentary front elevation, showing in detail the mechanism for reversing the feed of the auxiliary ribbons. Fig. 7 is a side elevation showing the typewriting machine and its table, together with the auxiliary paper rolls on their support behind the table, and illustrating the manner in which the paper strips are led upward at the rear of and introduced into the machine. Fig. 8 is a front elevation of the paper rolls and their supporting frame. Fig. 9 is a fragmentary enlarged front elevation, partly in section, showing in detail the mounting of one of the paper rolls on its supporting frame. Fig. 10 is a face view of the lock or latch for retaining the paper rolls in place. Fig. 11 is an enlarged sectional view showing the manner of interleaving or lacing the paper strips or ribbons with the inking ribbons.

Referring first to Figs. 1, 2, 3, and 7, the main frame of the machine is shown as comprising a base 1 from which rise corner

posts 1^a supporting a top plate 2. Fixed to the top plate are guide rails 3 grooved to cooperate with anti-friction balls, said balls also cooperating with the grooved front and rear bars of the carriage, said bars being numbered 5 and 6. The carriage, which is of the usual construction, also comprises side bars 7 connecting the front and rear bars. Mounted on the carriage is a platen frame or carrier of the usual or suitable construction comprising side bars 8 connecting front and rear bars 9 and 10. Journaled in the side bars 8 is a platen axle 11 provided with finger wheels 12 and carrying a platen 13. Since the paper strips or work sheets in the present instance are comparatively narrow, about two inches in width, the platen 13 may be made considerably shorter than the usual platen as shown and may be arranged at the middle portion of the platen axle 11. Said platen may be of the usual construction and is provided with heads 14 having hub portions which receive set screws 15, said set screws cooperating with the platen axle to maintain said axle and platen in fixed relation.

Adjacent the inner face of the right hand frame bar 8 a line space ratchet wheel 16 is mounted, said ratchet wheel having teeth of the usual pattern. A head 17 is secured by screws 18 to the inner face of the ratchet wheel, said head 17 having a hub 19 through which passes a set screw 20, securing the ratchet wheel to the platen axle. The ratchet wheel 16 prevents lengthwise displacement of the axle and platen in the platen frame toward the right, while a collar 11^a, suitably secured to the axle 11, contiguous to the inner face of the left-hand frame bar 8, prevents endwise displacement of the platen axle and the platen toward the left. The construction is such that the platen axle and platen may turn freely on the platen frame but are held from movement lengthwise thereof. Line spacing devices comprising the usual spring-pressed pawl 21, rock shaft 22 and finger piece or handle 23 are employed, the pawl 21 cooperating with the teeth of the ratchet wheel 16 to turn the platen for line spacing. The usual detent 24 may cooperate with the ratchet wheel 16 to maintain it and the platen in desired relationship with the platen frame. The frame bar 10 carries depending arms 25 supporting a feed roller 26 which is or may be of the usual construction but is short to correspond in length with the platen. The arms 25 carry at their lower ends a guide wire 27 which takes the place of the usual paper blade, the latter being dispensed with as it would interfere with the arrangement of my improvements. A paper table 28 may be provided at the rear of the platen, and paper fingers 29 at the front of the platen, the paper table and

paper fingers being mounted on the platen frame and being of ordinary construction.

The carriage and platen are urged leftward across the top plate by a spring drum 30, the leftward movements being controlled by escapement devices which are operated by the printing keys, said keys being connected with type bars which are circularly arranged on the top plate 2. The escapement devices and printing instrumentalities are not shown in the drawings but it is to be understood that they are or may be of the construction found in the Smith Premier typewriter, or if preferred, may be of any other suitable construction.

A ribbon 31 of the usual width is supported on ribbon spools 32 arranged one at each side of the machine below the top plate, said ribbon being guided at the printing point transversely of the printing line by a guide plate 33, such as is disclosed in the patent to Alexander T. Brown, No. 886,759 granted May 5th, 1908. The ribbon spools are mounted on shafts 33^a and are adapted to be connected in alternation with said shafts so as to feed the ribbon back and forth. The left-hand spool shaft is adapted to be connected with the spring drum 30 by the usual pawl and ratchet mechanism and motion is transmitted from the left-hand spool shaft to the right-hand spool shaft by devices comprising a rod 34. For a full disclosure of the ribbon mechanism reference may be had to said Brown Patent No. 886,759.

My invention contemplates supplementing the main ribbon 31 by two auxiliary ribbons 35 and 36. These auxiliary ribbons are considerably narrower than the main ribbon and are wound upon a pair of double spools which are journaled on the front bar or rod 9 of the platen frame and between the ends thereof. As shown in Fig. 5 each double spool comprises a hub portion 37, outer flanges 38 and a central intermediate flange 39 separating the two ribbons 35 and 36. From an inspection of Fig. 1 it will be noted that the auxiliary ribbon spools are arranged forward of the platen and nearer the sides of the platen frame than are the adjacent ends of the short platen. In order to guide the auxiliary ribbons from their spools across the printing point at the under side of the platen, guiding devices illustrated in Figs. 1, 2, 4 and 5 are provided. These guiding devices comprise two guide members, one arranged behind each auxiliary or double ribbon spool and beneath the platen. Each guide member is adjustably secured to a support composed of two curved plates or bars 40 which are arranged face to face and secured together by screw bolts 41 and nuts 42.

As clearly shown in Fig. 4 the end portions of each pair of clamping plates 40 are

circularly curved to embrace or partly surround the front and rear bars or rods 9 and 10 of the platen frame or carrier, the construction being such that by loosening the clamping bolts and nuts said plates may be slid lengthwise along the platen frame rods or may be entirely detached therefrom. Between the frame rods 9 and 10 the supporting plates 40 are curved downward so that the guide members may underlie the platen. The guide members are each clamped between their associate supporting plates 40 and extend inward therefrom toward each other. The guide members are preferably made of wire and each may comprise a main part 43, which is in the form of a long U-shaped loop, the open end portions of which are clamped between the associate supporting plates 40.

Suitably secured between the arms of the main portion 43, as by soldering or otherwise, are two diagonally arranged closed wire loops 44 and 45. At the inner end of the loop 43 is a transversely disposed closed loop 46 which may also be secured in place by soldering or the like. Between the loop 46 and the loop 44 a sheet metal protecting plate 47 is suitably secured to the main loop 43. Extending forward and slightly upward from the main loop toward the associate double ribbon spool is a guide arm 48. This arm is U-shaped and its ends are suitably secured to the forward arm of the loop 43.

The ribbons 35 and 36 may be looped or hooked at their inner ends over pins 37^a extending through the double spools parallel with the hubs thereof and close to said hubs. After being wound on the spools said ribbons pass downward side by side from their spools at the rear sides thereof and are drawn over and around the front and under faces of the front arm or portion of the guide arms 48, thence extending rearward and being guided downward through the diagonal loops 44 and 45, the ribbon 35 extending through the loops 44 and the ribbon 36 through the loops 45. The loops 44 and 45 serve as turning bars for the auxiliary ribbons, which leave said loops at right-angles to the directions at which they enter them, and thence are directed inward toward the middle of the machine, passing together through the loops 46 and under the plates 47, the ribbon 35 overlying the ribbon 36.

I have shown and described one construction of guide members but it will be obvious that these guide members may be formed or made in different ways from the one disclosed. Preferably, however, they should be made of wire as it has been found in practice that the round surface of the wire prevents cutting or tearing of the ribbons and breaking or roughening of their edges.

It will be apparent that by loosening the supporting plates 40 the guide members will be unclamped or freed and may be adjusted both longitudinally of the platen and also circumferentially thereof after which they may be reclamped between the plates 40.

The auxiliary ribbons may be fed longitudinally from one double spool to the other by devices operating automatically. Preferably this feeding is accomplished, as in the present instance, by connections operated by the actuation of the line spacing devices hereinbefore described. Secured to the inner face of each double ribbon spool, as by soldering or otherwise, is a small gear wheel 48^a (Figs. 1, 2 and 5), said gear wheel being adapted to turn on the frame rod 9 as an axis. Each gear wheel 48^a is formed with a hub portion 49 having a circumferential groove or depression 50. The gears 48^a are adapted to mesh with larger gear wheels 51. The gear wheels 51 are each provided with a hub or collar portion 52 which surrounds the platen axle 11 and receives a set screw 53, said set screw serving to fixedly secure the gear wheel to the platen axle. The auxiliary ribbons are shielded from the teeth of the gear wheels 51 by the protecting plates 47 on the guide members. The two gear wheels 51 are fixed on the axle 11 so that they are nearer to each other than are the cooperating gear wheels 48^a, as will be seen from an inspection of Fig. 1. It will be apparent therefore that only one of the gear wheels 48^a can be in mesh with its associate driver 51 at a time.

When the line spacing handle 23 is actuated to turn the platen through line space distances the gear wheels 51 will be turned, and whichever gear wheel 51 is in mesh with its associate gear wheel 48^a will operate to turn said gear wheel and the double ribbon spool to which said gear wheel is fixed, thereby winding the auxiliary ribbons on said ribbon spool and off the other auxiliary ribbon spool to an extent corresponding with the line space movement of the platen. When by repetitions of the line spacing operation the ribbons 35 and 36 have been entirely unwound from one of the double spools and wound on the other, or as illustrated in Fig. 1, have been unwound from the left-hand double ribbon spool and wound on the right-hand spool, it is necessary to reverse the longitudinal feeding mechanism. This operation in the present instance is accomplished by shifting the pair of double ribbon spools and their associate gear wheels 48^a lengthwise of the frame rod 9, so as to disengage, say, the right-hand gear wheel 48^a from its associated gear wheel 51 and cause the left-hand gear wheel 48^a to mesh with its associated driving gear.

The ribbon reversing devices herein shown comprise two arms 54 which are formed

with slots 55 engaging the grooves 50 in the gear wheel hubs 49 (Figs. 1, 2 and 5). The arms 54 are horizontally disposed and their rear end portions are perforated to fit loosely around the platen axle 11 which serves as a guide. Forward of the slots 55 the arms 54 are perforated to receive a connecting rod 56, the ends of which are threaded for the reception of clamping nuts 57, there being a pair of said nuts at each end of the rod. Each of said pairs of nuts embraces the end portion of one of the rods 54, the construction being such that the rod 56 and the arms 54 are firmly secured in a fixed relationship and are movable as a single piece to shift the gears 48^a and also serve to maintain said gears a fixed distance apart. The rod 56 passes through holes in the forked end portions 58 of a guide bracket 59, said guide bracket surrounding the frame rod 9 and being suitably fixed thereto as by a pin 60. Between the forks or bifurcated end portions 58, the rod 56 is provided with a finger-piece or handle 61 at its upper side by which the shift or reversing frame comprising the rod 56 and arms 54 may be moved.

At the under side of the rod 56 between the portions or fingers 58, a detent spring 62 is secured by a headed screw 63, as best shown in Fig. 6. The detent spring is formed with depressions 62^a and 62^b which cooperate with the under edges of the fingers 58 to maintain the slidable rod 56 and the arms 54 in either one of two predetermined positions. When the depression 62^a in the spring is engaged with the left-hand finger 58, as shown in Fig. 6, then the right-hand gear 48^a is in mesh with its associate gear 51, as shown in Fig. 1. If the handle or finger-piece 61 be pushed toward the right, the rod 56 will be moved longitudinally rightward, causing the disengagement of the depression 62^a and the engagement of the depression 62^b with the right-hand finger 58. This rightward movement of the slide rod 56 shifts the arms 54 rightward, and said arms at the sides of the slots 55 will engage with the sides of the groove 50 in the gear collars 49 and will shift the gears 48^a, together with the double spools fixed thereto, lengthwise along the frame rod 9. The distance between the depressions 62^a and 62^b in the detent spring is so regulated that the shift above described will cause the engagement of the left-hand gear wheel 48^a with its associate gear wheel 51 and the disengagement of the two right-hand gear wheels 48^a and 51, and the parts will be maintained set in this new relationship by the detent until a re-shift is required to again change the direction of feed of the two auxiliary ribbons.

It will be noted that in the construction shown the double ribbon spools are loosely

mounted on the frame rod 9. In order to prevent accidental turning of the disengaged double ribbon spool and consequent slack in the free portion of the ribbon, friction devices are provided, one for each double spool. In the present instance said friction devices are in the form of wire springs 64 coiled around the frame rod 9, one of said springs being interposed between each pair of supporting plates 40 and the outer flange 38 of the neighboring double spool, as will be understood from a consideration of Fig. 1. When the gear wheel 48^a of one of the double spools is disengaged, the friction spring 64 associated with the disengaged double spool will be compressed and the friction exerted by it on the outer face of the contiguous flange 38 will be sufficient to prevent accidental turning of the spool.

It will be obvious that the auxiliary ribbons would also be slackened or loosened if at any time the platen were rotated backward. In order, therefore, to prevent backward rotation of the platen, a detent or pawl 24^a is provided, said pawl being pivoted on a headed screw 24^b secured in the usual pivotally mounted support 24^c of the roller detent 24. The pawl or detent 24^a, as will be understood from a consideration of Fig. 4, so cooperates with the peripheral teeth of the line spacing ratchet wheel 16 that said ratchet wheel cannot be turned backward or in reverse direction while the pawl is in operative position, but when said ratchet wheel and platen are turned in line spacing direction the pawl 24^a will slip over the teeth of the ratchet wheel and will not interfere with the rotary movements thereof.

As has been stated, the work sheets preferably employed with the present construction are in the form of continuous strips or ribbons of paper wound into rolls which are mounted to turn in a portable supporting frame. This frame may be placed on the floor back of the typewriter table, said table being shown in Fig. 7 and being designated by the numeral 65. The supporting frame also is shown in Fig. 7; and also in Figs. 8 to 10. It comprises a base 66 which may be of wood and to which an upright U-shaped metal frame 67 is secured by screws 68. The frame 67 is of sufficient height to permit four rolls of paper to be mounted on it, one above another and between its sides.

As illustrated in Fig. 9 each roll of paper is mounted upon a core piece or barrel 69 of wood or the like, said core piece being journaled on a headed rod or bolt 70 which is supported in the sides of the frame 67. At the end opposite its head, the bolt 70 is formed with a groove 71 which cooperates with a slot 72 formed at the lower end of a slidable latch 73 (Figs. 8, 9 and 10), said latch being provided with an elongated slot

74 through which passes a headed screw 75 which takes into a threaded opening in the frame 67. The construction is such that the latch 73 is confined between the outer face of the frame 67 and the head of the screw 75 but is slidable up and down so that the slot 72 may be engaged with or disengaged from the groove 71 in the bolt 70. When the latch 73 is in locking position the bolt 70 is held from endwise movement, and serves both as a support for the associate roll of paper and also as a tie-piece to prevent the walls or sides of the frame 67 from separating. Washers 76 are arranged on the rod 70 between the inner faces of the frame 67 and the ends of the core piece 69 so that while the core piece and the roll of paper may freely turn on the rod 70, they are prevented from slipping along said rod and frictionally engaging with the inner walls of the frame 67.

As shown in Fig. 7 the loose ends of the rolls of paper ribbons or work sheets are led upward from underneath the rolls at the forward sides thereof. For descriptive purposes these paper strips or ribbons are numbered 77, 78, 79 and 80, the two lower rolls 77 and 78 being of ordinary paper and the two upper rolls 79 and 80 being of thin tissue paper. Near the upper part of the typewriting machine at the rear side thereof, the paper strips are brought together and are passed forward over a guide member or roller, the detail construction whereof is shown in Fig. 3. Said roller comprises a hollow sleeve or barrel 81 provided with two flanges 82 spaced far enough apart to receive the paper strips. The end portions of the barrel 81 outside the flanges are slightly reduced in diameter, forming bearing surfaces which cooperate with the end portions of a rod 83 which passes through the barrel 81 and is secured at its ends by headed screws 84 to arms 85. As shown in Fig. 2 the arms 85 are vertically disposed and at their lower ends are provided with open ended slots 86 which fit between the teeth of the usual tabulator stop rack-bar 87, said rack-bar being secured to arms 88 extending upward and rearward from the frame bar 6 of the carriage. Besides the receiving guide roller above described, the arms 85 carry a guide roller of similar construction comprising a barrel 89 and flanges 90. This latter guide roller is journaled upon a rod 91 which is secured at its ends to the arms 85 above the rod 83. After the paper strips or work sheets are led over the lower or receiving guide roller and fed through the machine and written upon, they are guided rearward, as shown in Fig. 7, over the upper guide roller and thence may pass downward behind the machine and table into the basket or other receptacle, whence they may be removed as convenient,

being cut up or detached in lengths suitable for handling.

In introducing the paper ribbons into the machine they pass over the receiving guide roller to the paper table 28 and thence downward between the platen and the feed roller 26, the latter during this introductory operation preferably being locked away from the platen in released position in the usual way. At the under side of the platen the paper strips are interleaved or threaded between the inking ribbons, as illustrated in Fig. 11, which shows the four paper strips and the three inking ribbons drawn to an enlarged scale. Between the main inking ribbon 31 and the lower auxiliary ribbon 36 passes the lowermost paper strip 77 which, as stated, is ordinary paper. Then between the two auxiliary ribbons 36 and 35 passes the second ordinary paper strip 78 and the lower one 79 of the tissue strips, said strip 79 being above said strip 78. Then between the platen 13 and the upper auxiliary inking ribbon 35 passes the second tissue strip 80. When printing operations take place it will be obvious that the paper strip 77 will receive a positive inked impression from the main inking ribbon 31, the paper strip 78 will receive a positive inked impression from the inking ribbon 36, the paper strip 79 will receive a negative or reverse inked impression from the inking ribbon 35 and the paper strip 80 will receive a positive inked impression from said inking ribbon 35. Thus it will be seen that all four of the paper strips will receive inked impressions; that one which receives the negative impression being of thin tissue paper may be easily read through the paper so that the impressions will appear positive.

It will be noted that the rolls of paper are stationary and that the printed portions of the paper, after they fall into the receiving basket, may be stationary, while these portions of the paper which are in the machine and which are being fed through the machine and over the guide rollers will move from side to side as the platen carriage is moved from side to side across the top plate. The paper, however, is comparatively narrow and the stationary parts of it are removed some distance from the carriage, and it is found in practice that the paper will not twist sufficiently to interfere with the free movements of the carriage nor will the paper crease or wrinkle permanently or so as to detract from its appearance.

By my present invention I provide mechanism for simultaneously writing four inked copies, said mechanism being combined with the usual platen, platen carriage, paper feeding, line spacing and ribbon feeding devices of a typewriting machine, and said mechanism comprising a support for a plurality

of rolls of continuous strips or webs of paper, said support being preferably stationary and arranged behind the platen, a receiving paper guide for the continuous strips, said guide being on the carriage, a pair of ribbon spools carrying a pair of auxiliary ribbons and mounted on the carriage, a ribbon guide for guiding one auxiliary ribbon over the other lengthwise of the printing line, means for connecting said ribbon spools in alternation with the usual line spacing mechanism, and a paper guide on the carriage for guiding the continuous strips or webs out of the machine, the continuous strips as they pass through the machine being interleaved or threaded one between the regular ribbon and one of the auxiliary ribbons, two between the two auxiliary ribbons and one between the platen and the other of the auxiliary ribbons.

It will be seen that the auxiliary ribbon spools rotate in planes transverse of the platen frame, this rotation being effected by sets of gears each set of gears comprising a gear 48^a and a larger gear 51, there being two of these sets of gears 48^a and 51, the sets being adapted to be rendered operative in alternation.

My improved mechanism for duplicating copies is comparatively simple and very efficient, enabling the operator to write almost continuously and without pause for adjusting the parts or inserting fresh paper. The auxiliary ribbon mechanism is self-contained; that is to say, it is confined between the end bars of the platen carrier or frame, and none of the parts project outward or are unprotected, so that they are not liable to injury as in prior constructions. One of the auxiliary ribbons may of course be employed without the other, and various changes in arrangement and construction may be made 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 frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, and a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair.

2. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair, and a detent for maintaining said shifting frame set in one or another of a plurality

of predetermined relations with said platen frame.

3. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, a shifting frame comprising an endwise movable rod and operable to connect one or another of said second pair of gears with one of the first recited pair, and a detent spring secured to said rod and coöperative with a relatively fixed part to maintain said shifting frame set in one or another of a plurality of predetermined relations with said platen frame.

4. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, and a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair, said shifting frame comprising a pair of arms connected with said second pair of gears and an endwise movable rod joining said arms.

5. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, and a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair, said shifting frame comprising a pair of arms guided on said platen axle and each connected with one of said second pair of gears, and a rod to the ends of which said arms are fixedly secured.

6. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears, one fixed to each ribbon spool, a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair, said shifting frame comprising a pair of arms connected with said second pair of gears and an endwise movable rod joining said arms, a guide for said rod fixed to the platen frame, and a detent fixed to said rod.

7. In a typewriting machine, the combination of a platen, a platen frame, a platen axle rotatable thereon, a pair of gears fixed to said axle, ribbon spools on said platen frame, a second pair of gears one fixed to each ribbon spool, a shifting frame for connecting one or another of said second pair of gears with one of the first recited pair, said shifting frame comprising a pair of arms connected with said second pair of gears and an endwise movable rod joining

said arms, a forked guide for said rod, said guide being secured to said platen frame, and a detent spring secured to said rod and coöperative with the forks of said guide.

5 8. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of driving gears fixed to said axle one between each end of the platen and the adjacent end of the platen frame, ribbon spools mounted upon said platen frame between the ends thereof, a pair of driven gears one fixed to each ribbon spool, and a hand-operated shifting frame for connecting one or another of said driven gears with one of said driving gears, said ribbon spools and the driving and shifting mechanism therefor all being contained between the ends of the platen frame.

20 9. In a typewriting machine, the combination of a platen frame, a platen axle rotatable thereon, a platen, a pair of driving gears fixed to said axle one between each end of the platen and the adjacent end of the platen frame, ribbon spools rotatably and slidably mounted on the front bar of said platen frame, driven gears one fixed to each ribbon spool, hand operated means for shifting said ribbon spools to bring one or another of said driven gears into mesh with one of said driving gears, and a detent coöperative with said means to set said spools and said driven gears.

35 10. In a typewriting machine, the combination of a platen frame comprising a front rod, a platen axle rotatable on said frame, a platen fixed to said axle, a line spacing ratchet wheel fixed to said platen axle inside of said platen frame contiguous to one end thereof, a collar fixed to said platen axle inside of said platen frame and contiguous to the other end, line spacing devices coöperative with said ratchet wheel, a pair of ribbon spools rotatable on the front rod of said platen frame, means for connecting said ribbon spools with said platen axle so that they may be driven thereby, and hand-operated devices for moving said ribbon spools endwise of the platen frame to alternately connect them with said platen axle.

55 11. In a typewriting machine, the combination of a platen frame, a platen thereon, line spacing devices including a ratchet wheel for turning said platen, a pair of ribbon spools, two sets of gears for connecting said ribbon spools with said ratchet wheel, and a hand-operated shifting device for alternately rendering operative said sets of gears.

60 12. In a typewriting machine, the combination of a platen frame, a platen thereon, line spacing devices including a ratchet wheel for turning said platen, a pair of ribbon spools, two sets of gears for connect-

ing said ribbon spools with said ratchet wheel, a hand-operated shifting device for alternately rendering operative said sets of gears, and a detent coöperating with said ratchet wheel to prevent backward rotation thereof. 70

13. In a typewriting machine, the combination of a platen frame, a platen thereon, line spacing devices including a ratchet wheel for turning said platen, a pair of ribbon spools, two sets of gears for connecting said ribbon spools with said ratchet wheel, a hand-operated shifting device for alternately rendering operative said sets of gears, friction springs one coöperating with each ribbon spool, and a detent engageable with said ratchet wheel to prevent backward rotation thereof. 75 80

14. In a typewriting machine, the combination of a platen, a platen frame, a plurality of ribbons supported on said platen frame, spools for said ribbons, a duplex guide on said platen frame and common to said plurality of ribbons, and gearing connecting said platen and said spools so that said spools may be turned when said platen is rotated. 85 90

15. In a typewriting machine, the combination of a platen, a platen frame, a plurality of ribbons supported on said platen frame, spools for said ribbons, a duplex guide on said platen frame and common to said plurality of ribbons, said guide being adjustably mounted on said platen frame, and gearing connecting said platen and said spools so that said spools may be turned when said platen is rotated. 95 100

16. In a typewriting machine, the combination of a platen frame, a pair of double ribbon spools carrying two ribbons and rotatable in planes transverse of the platen frame, and a guide by which said ribbons are guided from the spools side by side transverse of the printing line and then guided one over the other lengthwise of the printing line. 105 110

17. In a typewriting machine, the combination of a platen, a platen frame supporting said platen, ribbon spools on said platen frame carrying a plurality of ribbons, spools for said ribbons, a duplex ribbon guide for guiding said ribbons in superposed relationship lengthwise of the printing line, and gearing connecting said platen and said spools so that said spools may be turned when the platen is rotated. 115 120

18. In a typewriting machine, the combination of a platen, a platen frame supporting said platen, ribbon spools on said platen frame carrying a plurality of ribbons, spools for said ribbons, a duplex ribbon guide for guiding said ribbons in superposed relationship lengthwise of the printing line, said guide being adjustably supported on said platen frame, and gearing connecting said 125 130

platen and said spools so that said spools may be turned when the platen is rotated.

19. In a typewriting machine, the combination of a platen frame, ribbon spools thereon carrying a plurality of ribbons, supports on said platen frame, and ribbon guides on said supports, said ribbon guides each being provided with a plurality of turning bars for receiving said ribbons as they pass from said ribbon spools side by side and thereafter directing said ribbons in superposed relationship.

20. In a typewriting machine, the combination of a platen frame comprising parallel bars, ribbon spools mounted on said platen frame, one near each end thereof, clamping plates detachably secured to said front and rear bars, and ribbon guides clamped between said plates.

21. In a typewriting machine, the combination of a platen, a platen frame comprising parallel bars, clamping plates, means for detachably securing said clamping plates to said parallel bars, and ribbon guides clamped between said clamping plates, the construction being such that when said means are operated to loosen the clamping plates, said guides may be adjusted both lengthwise of said platen and longitudinally thereof.

22. In a typewriting machine, the combination of a platen, a platen frame, ribbon spools, a ribbon guide support, and a ribbon guide for guiding a plurality of ribbons in superposed relationship, said guide being adjustable lengthwise of said platen and also circumferentially thereof.

23. In a typewriting machine, the combination with a ribbon feeding mechanism for the main ribbon and a guide for said main ribbon, of a pair of duplex ribbon guides for a plurality of auxiliary ribbons, each duplex ribbon guide comprising a plurality of parallel turning devices, the turning devices of one duplex guide inclining toward the turning devices of the other duplex guide.

24. In a typewriting machine, the combination of a platen, a platen frame, ribbon spools, and a pair of ribbon guides mounted on said platen frame and adapted to a plurality of ribbons, each ribbon guide comprising a pair of parallel turning bars, each turning bar of said pair cooperating with one of said ribbons.

25. In a typewriting machine, the combination of a platen, a platen frame, ribbon spools, ribbon guide supports, and a pair of ribbon guides mounted on said platen frame, each ribbon guide comprising a pair of parallel turning bars, said ribbon guides being adjustable toward and away from each other, and being adapted to receive the ribbons as they pass side by side from said ribbon spools and thereafter directing said

ribbons inward toward the middle of the platen in superposed relationship.

26. In a typewriting machine, the combination of a platen, a platen frame, a pair of double ribbon spools one mounted near each end of the platen frame, a pair of guides one mounted near each end of the platen frame, each ribbon guide comprising a pair of parallel turning bars for enabling the ribbons to be guided off each spool side by side and then directed lengthwise of the printing line one overlying the other.

27. In a typewriting machine, the combination of a platen frame, a platen, line spacing mechanism, ribbon spools on said platen frame, connections between said line spacing mechanism and said ribbon spools, a ribbon guide, and a protecting plate for shielding the ribbon carried by said spools from said connections.

28. In a typewriting machine, the combination of a platen frame, a platen, line spacing mechanism, ribbon spools on said platen frame, gear connections between said line spacing mechanism and said ribbon spools, ribbon guides, and protecting plates secured to said guides and shielding the ribbon carried by said spools from said gear connections.

29. In a typewriting machine, the combination with a platen, a platen carriage, and ribbon feeding mechanism on the frame of the machine for feeding the regular ribbon, of mechanism for duplicating inked copies comprising a support for a plurality of rolls of paper, a paper guide on the carriage for receiving the paper from said rolls, ribbon spools for a plurality of auxiliary ribbons, said ribbon spools being mounted on the carriage, means connected with said platen for automatically feeding said auxiliary ribbons, and a guide for guiding the paper out of the machine, the paper from the rolls being interleaved with the auxiliary ribbons.

30. In a typewriting machine, the combination with a platen, a platen carriage, and ribbon feeding mechanism on the frame of the machine for feeding the regular ribbon, of mechanism for duplicating inked copies comprising a support for a plurality of rolls of paper, said support being stationary and arranged behind the machine, a paper guide on the carriage for receiving continuous strips or webs of paper led from said rolls, ribbon spools for a plurality of auxiliary ribbons, said ribbon spools being mounted on the carriage, platen line-spacing mechanism, means for connecting said ribbon spools in alternation with said line-spacing mechanism, and a guide on the carriage for guiding the paper strips out of the machine, the paper strips as they pass through the machine being interleaved with the auxiliary ribbons.

31. In a typewriting machine, the combination with a platen, a platen carriage, and ribbon feeding mechanism on the frame of the machine for feeding the regular ribbon, of mechanism for duplicating inked copies comprising a support for a plurality of rolls of paper, a paper guide on the carriage for receiving the paper from said rolls, ribbon spools for a plurality of auxiliary ribbons, a ribbon guide on the carriage for guiding said auxiliary ribbons one over the other lengthwise of the printing line, said ribbon spools being mounted on the carriage, means connected with said platen for automatically feeding said auxiliary ribbons, and a guide for guiding the paper out of the machine, the paper from the rolls being interleaved with the auxiliary ribbons.

32. In a typewriting machine, the combination with a platen, a platen carriage, and ribbon feeding mechanism on the frame of the machine for feeding the regular ribbon, of mechanism for duplicating inked copies comprising a support for a plurality of rolls of paper, said support being stationary and arranged behind the machine, a paper guide on the carriage for receiving continuous strips or webs of paper led from said rolls, ribbon spools for a plurality of auxiliary ribbons, said ribbon spools being mounted on the carriage, platen line-spacing mechanism, means for connecting said ribbon spools in alternation with said line-spacing mechanism, and a guide on the carriage for guiding the paper strips out of the machine, there being two auxiliary ribbons and four paper strips, one paper strip passing between the regular ribbon and one of the auxiliary ribbons, two of the paper strips passing between the auxiliary ribbons, and one of the strips passing between the platen and one of the auxiliary ribbons.

33. In a typewriting machine, the combination of a carriage, a pair of duplex ribbon guides mounted on said carriage, each ribbon guide comprising a pair of parallel turning devices, the turning devices of the two ribbon guides inclining toward each other, and an additional ribbon guide supported on the frame of the machine.

34. In a typewriting machine, the combination of a carriage, a platen thereon, a plurality of ribbons superposed over each other and extending along said platen, a plurality of spools arranged at each end of the platen and mounted on said carriage, said ribbons being wound on said spools, connections at each end of the platen between said platen and said spools, and means for rendering the connections at opposite ends of the platen alternately operative, said means at a single actuation throwing out of operation the connections at one end of the platen and concurrently throwing

into operation the connections at the other end of the platen.

35. In a typewriting machine, the combination of a platen, a platen frame, an axle by means of which the platen is journaled in said platen frame, a pair of ribbon spools mounted at the ends of the platen with their axes extending longitudinally of the platen, diagonal guides at the ends of the platen, over which the ribbon folds to run along the platen in traveling from spool to spool, gears upon the platen axle, and pinions upon the spools; each pinion being movable into and out of mesh with its associated gear.

36. In a typewriting machine, the combination of a platen, a platen frame, an axle by means of which the platen is journaled in said platen frame, a pair of ribbon spools mounted at the ends of the platen with their axes extending longitudinally of the platen, diagonal guides at the ends of the platen, over which the ribbon folds to run along the platen in traveling from spool to spool, gears upon the platen axle, pinions upon the spools, and a finger piece mounted upon the platen frame and connected to move the pinions alternately into and out of mesh with their gears.

37. In a typewriting machine, the combination of a platen, a platen frame, an axle by means of which the platen is journaled in said platen frame, a pair of ribbon spools mounted at the ends of the platen with their axes extending longitudinally of the platen, diagonal guides at the ends of the platen, over which the ribbon folds to run along the platen in traveling from spool to spool, gears upon the platen axle and pinions upon the spools; said diagonal guides being mounted for movement relatively to the platen, a plurality of ribbons being wound upon said spools and passed through said diagonal guides so that one sheet of paper may be threaded between said ribbons and another sheet may lie between one of the ribbons and the platen.

38. In a typewriting machine, the combination of a platen, a platen frame, an axle by means of which the platen is journaled in said platen frame, two pairs of ribbon spools mounted at the ends of the platen with their axes extending longitudinally of the platen, diagonal guides at the ends of the platen over which the ribbons fold to run one in front of the other and both along the platen, gears upon the platen axle, pinions connected to the spools, one pinion at each end of the platen, and means to couple and uncouple the pinions with the gears.

39. In a typewriting machine, the combination of a platen, a platen frame, an axle by means of which the platen is journaled in said platen frame, a pair of ribbon spools mounted at the ends of the platen, guides at the ends of the platen, over which the rib-

bon turns to run along the platen, gears
upon the platen axle, pinions upon the spools,
and a finger piece mounted upon the platen
frame and connected to move the pinions
5 alternately into and out of mesh with their
gears.

Signed at Philadelphia, in the county of

Philadelphia and State of Pennsylvania,
this 20th day of August, A. D. 1908.

JOHN Z. GLENZING.

Witnesses:

S. G. BIRNIE,

C. WILSON ROBERTS.