

No. 882,993.

PATENTED MAR. 24, 1908.

A. T. BROWN.
TYPE WRITING MACHINE.
APPLICATION FILED JUNE 4, 1904.

6 SHEETS—SHEET 1.

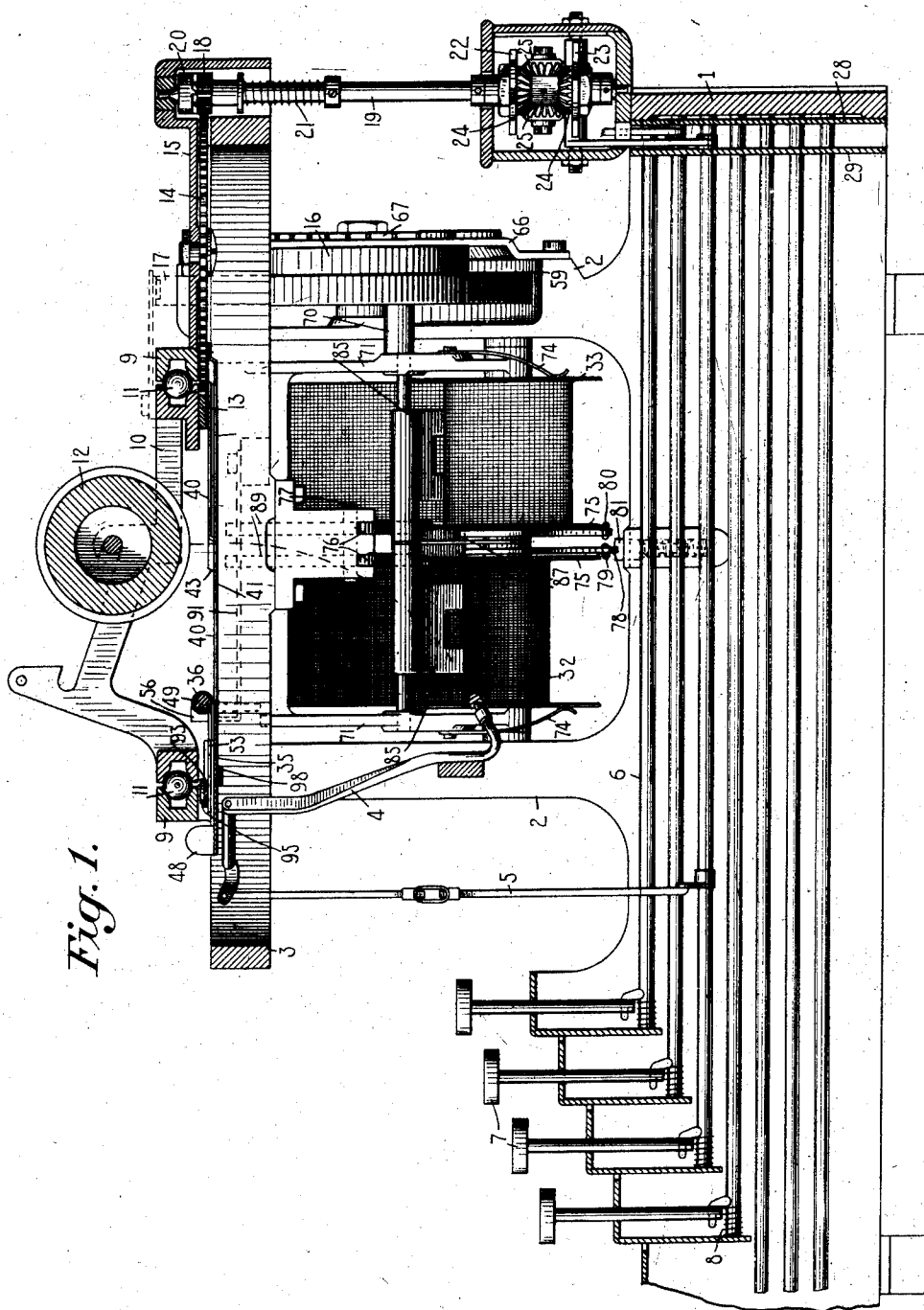


Fig. 1.

Witnesses
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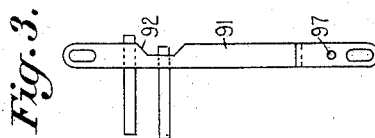
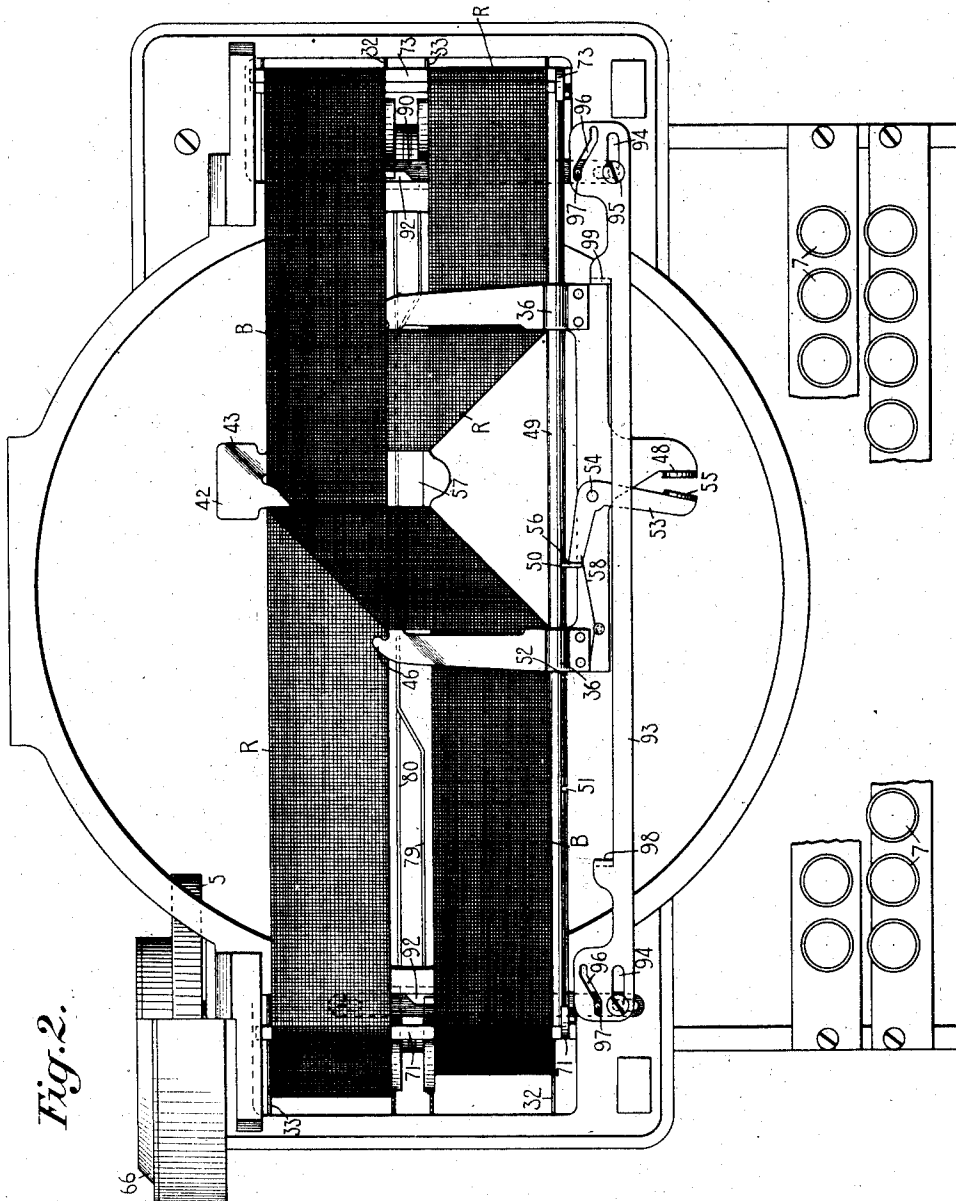
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5 SHEETS—SHEET 2.



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6 SHEETS—SHEET 3.

Fig. 4.

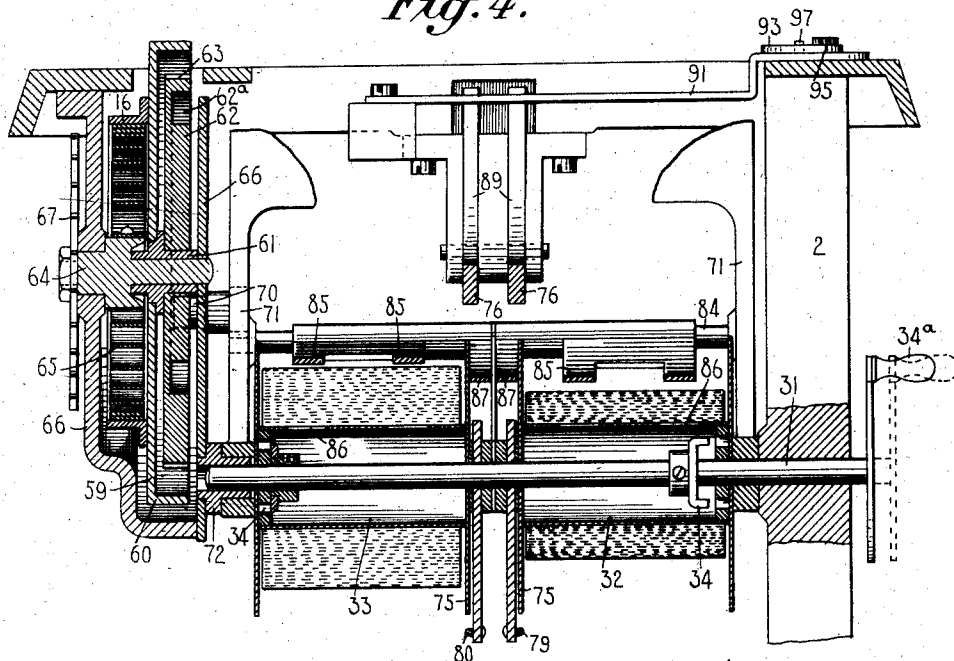
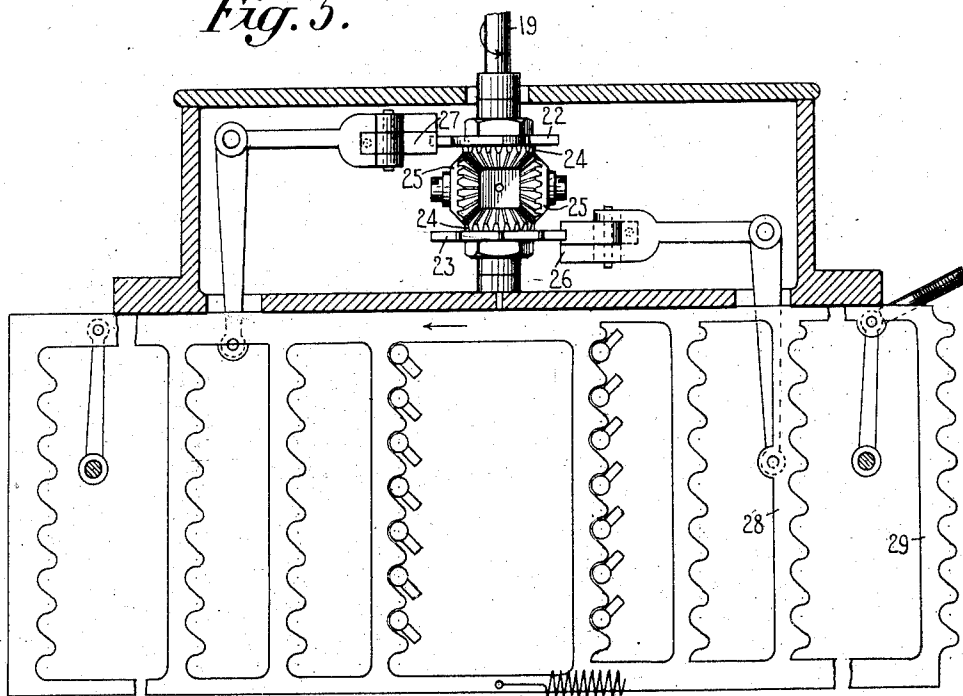


Fig. 5.

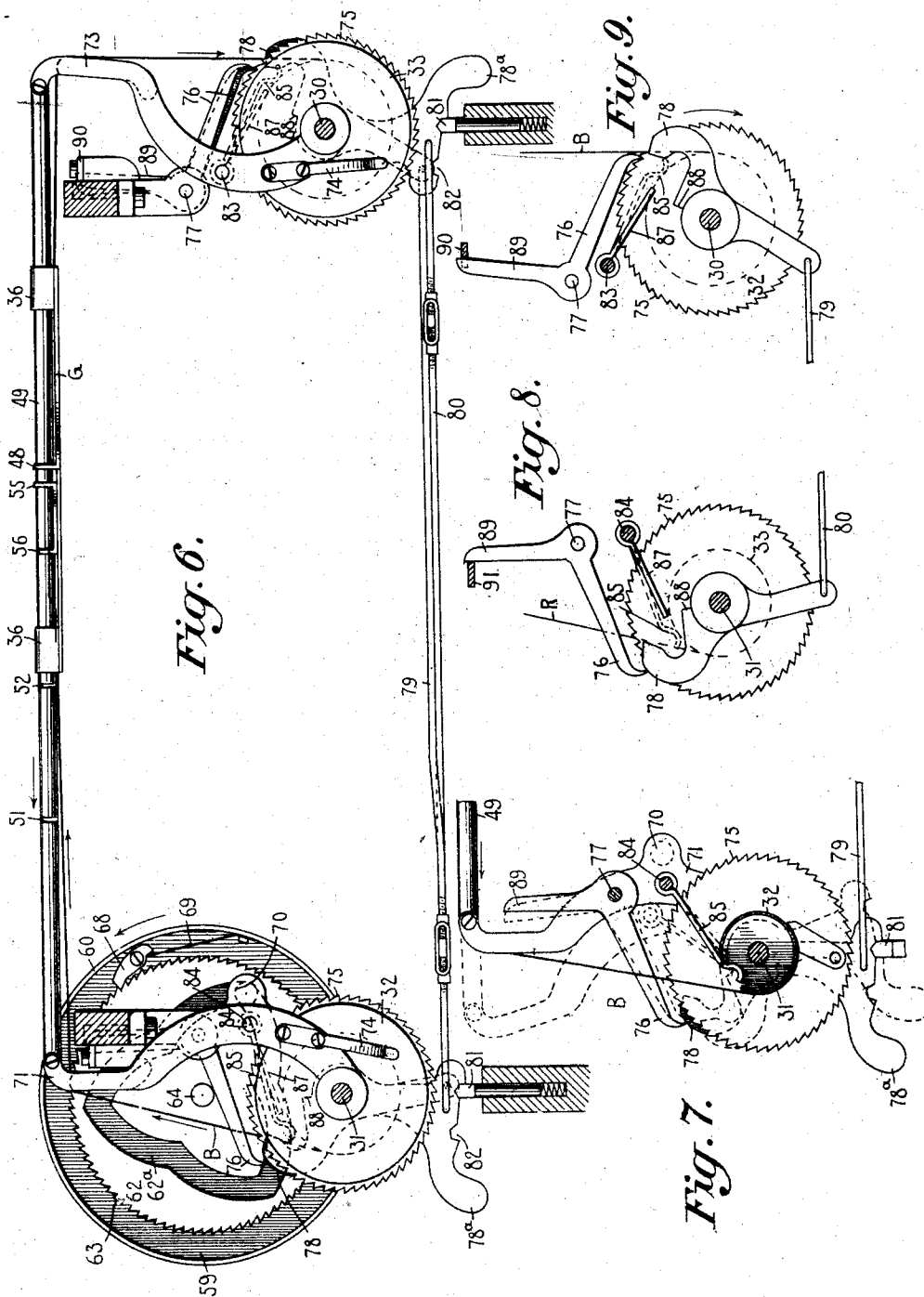


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5 SHEETS—SHEET 5.

Fig. 10.

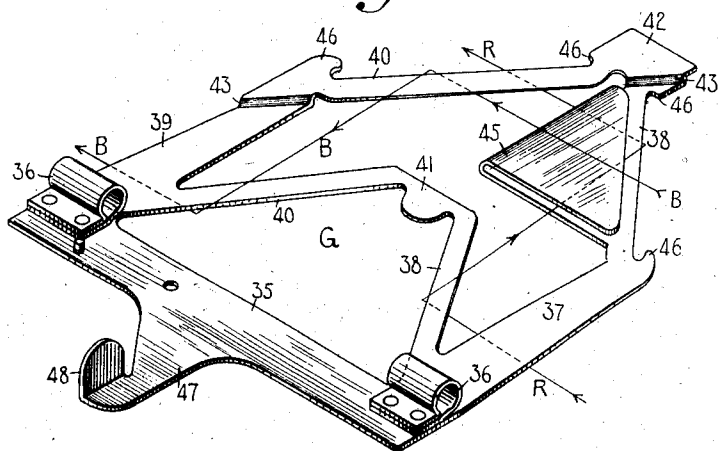
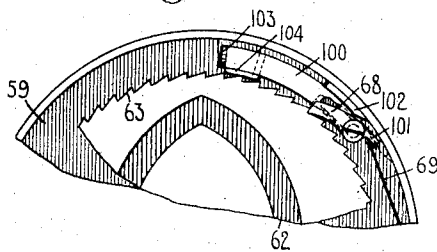


Fig. 11.



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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

No. 882,993.

Specification of Letters Patent.

Patented March 24, 1906.

Application filed June 4, 1904. Serial No. 211,129.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, 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 typewriting machines, and its primary object is to bring into use at the printing-point any of a plurality of ribbons; another object is, in a machine having a plurality of inking ribbons movable into and out of position for use at the printing-point, to wind only the ribbon in use and to throw its winding mechanism out of action and the winding mechanism of another ribbon into action whenever that other ribbon is moved into position for use at the printing-point and the first ribbon is moved out of such position; another object is automatically to reverse the travel of each ribbon; another object is to mount spools on the same shafts and to wind any ribbon off and on to its spools independently of the other spools and their ribbon; another object is to move both ribbons out of position to be struck by the type at the printing-point and to keep them so in order that the type may strike direct for mimeograph work; another object is to prevent the mixing of the inking materials of two ribbons which cross each other adjacent to the printing-point; another object is to use the ribbons in lines running widthwise of the ribbons, this being merely the preferred method, however; other objects will appear hereinafter.

To these ends, the invention consists of features of construction, arrangements and combinations of devices hereinafter described and more particularly pointed out in the appended claims.

The invention is embodied in the machine illustrated in the accompanying drawings, which form part hereof, in which

Figure 1 is a central vertical longitudinal sectional view with parts omitted. Fig. 2 is a plan view of the same, with parts omitted. Fig. 3 is a detail view. Fig. 4 is a vertical sectional view through ribbon-spools and spring-drum. Fig. 5 is a rear elevation of escapement mechanism. Fig. 6 is a front view of the ribbon mechanism. Fig. 7 is a view illustrative of the action of the mechanism for causing endwise feed of the ribbons. Figs. 8 and 9 are views illustrative of the re-

versing mechanism of the ribbon feed. Fig. 10 is a perspective view of the ribbon guides shown in Figs. 1 and 2; and Fig. 11 is a detail view showing a pawl and ratchet release mechanism.

Referring to the drawings in which my invention is shown applied to a Smith Premier typewriter, the reference numeral 1 marks a suitable base from which rise standards 2, and 3 marks a top-plate or type-ring in which type bars 4 are journaled in the usual or any suitable manner (but one type bar is shown). The type bars 4 are connected by links 5 (but one being shown) with rock shafts 6 which are journaled as usual in the base and are actuated by keys 7 and springs 8, as usual.

The reference numeral 9 marks grooved rails attached to the ring 3, and 10 designates a paper-carriage having grooves in its front and rear sides. Anti-friction devices 11 connect the rails 9 and the carriage 10 and retain the latter in place.

12 is the usual roller-platen, and 13 is a rack bar fast to the carriage 10, while 14 is a gear wheel journaled on the back-plate 15 and meshing with the rack-bar 13.

The reference numeral 16 marks a spring-drum which is connected with the carriage by a cord 17 or the like, and draws the carriage to the left.

18 designates a pinion which meshes with the gear 14 and which is loose upon the vertical shaft 19 and is connected with said shaft by a clutch 20. A spring 21 holds the clutch closed.

The references 22, 23 mark escapement-wheels loose on but geared to the shaft 19 by means of bevel pinions 24 on said wheels and bevel pinions 25 journaled on arms fast to the shaft 19. Rigid and movable dogs 26, 27 coact with said wheels 22, 23, one set of dogs being actuated by a gate 28 and the other set of dogs by another gate 29. Certain of the rock shafts 6 are arranged with arms to actuate gate 28, certain other of said rock shafts are arranged to actuate gate 29, and yet certain other shafts operate both gates. The wheel 22 has half as many teeth as wheel 23.

Inasmuch as the foregoing escapement mechanism forms the subject-matter of another application for Letters Patent of the United States, filed May 6, 1904, Serial No. 206,661, its construction and operation need not be herein further described.

In the preferred form of the invention, which is that illustrated in the accompanying drawings, the ribbon-spools are mounted by pairs upon two shafts, and each ribbon passes from a spool on one end (as the front end) of one shaft to a spool on the other end (as the rear end) of the other and adjustable oblique guides for each ribbon are provided for guiding the ribbons from spool to spool, the adjustability of the guides providing for the shifting of the ribbons to bring one into and to put the other out of use at the printing-point, and also throwing both out of position when mimeograph work is to be done.

In the preferred form of the invention, the oblique guides for the ribbons are all rigidly connected together, so that one movement will accomplish the shifting of one ribbon out of and the other into position for use; or both out of position when mimeographing is to be done. The oblique guides, in the preferred form of the invention, are disconnectably attached to a reciprocatory rod for the purpose of using the ribbon in transverse lines, while the spools of the ribbon in use are intermittently rotated to draw the ribbon off of one and to wind it on the other of its spools, and the feeding mechanism of the ribbon not in use is out of action, whence it follows that each ribbon is used uniformly from end to end, as a subsequent use begins where the previous use left off.

The shafts on which the spools are mounted are rotatable and the spools are independently connectible with said shafts, whereby either spool on a shaft may be rotated thereby independently of the other spool, as in putting on a ribbon, and in the regular use of the machine.

Where the ribbons, in passing from one spool to another, move in parallel paths and each ribbon is off-set from one to another of said paths by parallel oblique guides, the ribbons may be used in transverse lines by automatically moving said guides back and forth in the direction of the length of said ribbons, the part used being in the off-set, or path from one to another of said parallel paths; but if there be no automatic reciprocation of said guides, and the ribbon be used in said off-set portion, longitudinal lines of the ribbon are used. If non-parallel oblique guides be used, the ribbon may be used in either transverse or longitudinal lines according as the guides are reciprocated or not. That is to say, that insofar as the changing of the ribbon in use by moving the guides is concerned, the automatic reciprocation of said guides is a secondary matter; though I prefer to have such automatic reciprocation, or to use the ribbon transversely.

Referring now to the drawings, the reference numerals 30, 31 mark two shafts mounted in the standards 2 for both rotation and

endwise motion. 32 marks the spools for a ribbon B, and 33, the spools for a ribbon R, said spools being loose on said shafts and independently connectible thereto by clutch members 34, which engage corresponding clutch members formed on the inside of the hubs of the spools, as indicated in Fig. 4. Each of the shafts 30 and 31 is extended through the framework towards the front of the machine, and has fixed thereon a crank handle 34^a. The shaft may be connected to either of the spools mounted thereon by moving said shaft endwise, and the ribbon may then be wound on that spool by turning the crank. The reference letter G designates the guide-plate as a whole (see Fig. 10), said plate preferably being formed from a piece of sheet-metal cut and bent into the desired shape. At the front side of the guide-plate G is a bar 35 to which eyes 36 are suitably attached by screws or rivets. Extending rearwardly from said bar at the right is an arm 37, from which extend the parallel oblique guides 38; while from the left hand end of bar 35, the arm 39 extends rearwardly and has the parallel oblique guides 40 extending therefrom at right angles to the guides 38. For the purpose of mutual support and strength, the ends of guides 38 and 40 are joined by the parts 41, 42, and the rearmost guide 40 is set slightly above the plane of its companion by vertical shoulders or off-sets 43. If desired a transverse bar may be provided to support the end 42. For the purpose of preventing the ribbons R and B from rubbing against each other, the triangular U-shaped guide 45 is provided, the ribbon R passing therethrough while the ribbon B passes thereover. Lugs 46 serve to retain the selvages of the ribbons in place. At the front of the bar 35 is the forwardly extending arm 47 which has a finger piece 48 turned up therefrom. The oblique guides 40 are of the sort sometimes designated in this art as "turning bars."

A bar 49 extends across the machine and passes through the eyes 36 (see Fig. 2), and said bar has three notches 50, 51, 52 cut in its forward side. The bar 35 of the guide plate G has a bell-lever 53 fulcrumed thereon at 54 (Fig. 2) and said lever 53 is provided with a finger-piece 55 adjacent to the finger-piece 48 above mentioned, and also a tooth 56 which is adapted to enter the notches 50, 51, 52 and thus attach together the plate G and bar 49. When the tooth 56 is in the notch 50, as shown in Fig. 2, the plate G is in such a position that the ribbon B is in use at the printing-point. By pressing parts 48 and 55 together, the tooth 56 is disengaged from whatever of the notches 50, 51 and 52 it may be in engagement with, and the plate G may be slid along the rod 49. When tooth 56 is engaged with notch 51, the ribbon R is brought into position for use at

the printing-point, while ribbon B is moved out of such position. When the tooth 56 is in the notch 52, neither ribbon, when the rod 49 is in a central position as hereinafter described, is in position for use, and the space 57 is opposite the printing point, whereby the type strike direct for mimeograph work. A spring 58 serves to keep the tooth 56 in engagement with the notches 50, 51, 52.

10 The rod 49 has an automatic endwise motion so as to move the plate G to and fro and cause the ribbons to be used widthwise thereof, each in the part thereof lying between its parallel oblique guides and where but a single thickness of the ribbon intervenes between the paper and the type. The mechanism shown in the drawings for giving the rod 49 its automatic endwise motion will now be described, reference being had first to Fig. 4.

20 The spring drum 16 has fast thereto a plate 59 which has a flange 60 on which is wound the strap 17. Mounted loosely on the hub 61 of the plate 59 is a cam-plate 62 provided with ratchet teeth 63 on its periphery. The hub 61 turns on the shaft 64 to which one end of the spring 65 is fast, said shaft 64 being journaled in the plates 66 and provided with a ratchet and pawl 67 as usual. Pivoted to the plate 59 is a pawl 68 (see Figs. 6 and 11) which is held in engagement with ratchet 63 by a spring 69, the parts being so arranged that the pawl drives the ratchet during the forward movement of the paper carriage. The cam plate 62 has formed in its front face 35 a cam groove 62^a, in which works a follower consisting of a roller or pin 70 which is carried by a yoke-shaped frame 71. This frame straddles the spools 32 and 33, and one of its arms is fulcrumed on a sleeve 72 which 40 is fixed to a plate 66 and which forms the bearing for one end of the shaft 31. The other arm of the frame 71 is journaled on the shaft 31 itself, just inside the front post 2 (see Fig. 4). The cam groove 62^a imparts 45 to the frame 71 an oscillatory motion about the shaft 31. The shaft 30 has journaled thereon a frame 73, similar to the frame 71, each of said frames 71 and 73 being shaped somewhat like an inverted U. The transverse parts of these frames form guides for the ribbons B and R. The bar 49 is pivotally connected at its ends with the frames 71 and 73 (Figs. 2 and 6). The cam 62^a reciprocates the frames 71 and 73, the bar 49, 55 and the guide plate G, whereby the ribbon in use at the printing point is moved widthwise during the forward movement of the carriage. The above-described mechanism moves the bar 49 to and fro endwise and ink 60 is taken from the ribbon in use in transverse lines.

For the purpose of feeding the ribbon in use, the following mechanism is provided in the machine illustrated in the drawings:—

65 Friction springs 74, (Figs. 1 and 6), fast on

the frames 71 and 73, bear against the spools 32, 33, and cause them to move in unison with the said frames, except as hereinafter mentioned. Each spool is provided with a ratchet wheel 75, the ratchet wheels of the spools being, by preference, on the ends adjacent to each other. Pawls 76 are hung at 77 on the main frame of the machine and are adapted, when in working positions, to co-act with said wheels 75 to prevent the corresponding spools from being oscillated with the frames 71 and 73 by the frictional contact of the springs 74, the pawl permitting the spool to turn only in one direction. When one of the pawls 76 is in engagement 80 with the ratchet wheel of one of the spools, the corresponding friction spring 74 turns that spool in one direction, but rubs idly over it in the other, with the result that the ribbon is fed longitudinally. This operation requires that the other spool of that ribbon be not restrained by its pawl 76. To this end, throw-outs 78 are provided consisting of levers pivoted on the shafts 30, 31, and having cam ends adapted to co-act with and 90 raise the pawls as indicated in Fig. 7 by the full lines. The throw-outs 78 for the spools 32 are connected by a link 79 and the throw-outs 78 for the spools 33 are connected by a link 80, the connections in each case being 95 such as to move one throw-out into working position as the opposite throw-out is moved out of working position. Spring-actuated pins 81, seated in holes in the side pieces of the main frame, co-act with notches 82 in one of each pair of throw-outs 78 to hold the latter in position. 100

In Figs. 7 and 9 are shown the two spools 32 which carry the ribbon B, with the reversing mechanism set to feed the ribbon 105 towards the spool shown in Fig. 9. One of the throw-out levers 78 of each pair is formed with a handle portion 78^a whereby the feed of either ribbon may be reversed by hand. I have also provided automatic mechanism for 110 operating the throw-outs 78 to reverse the endwise travel of the ribbon. Rods 83 and 84 are fixed in the frames 73 and 71 respectively, each of said rods extending above the spools from one arm to the other of its frame. 115 Arms 85 are loosely hung on the rods 83 and 84, and said arms have curved free ends which rest on the ribbons wound on the several spools. The barrels of the spools are slotted at 86 to allow the ends of the arms to drop 120 into the barrels when the ribbons uncover said slots, as indicated in Fig. 7. Each arm 85 has a second arm 87 integral therewith, which second arm is adapted, when arms 85 drop into slots 86, to drop behind a shoulder 125 88 on the corresponding throw-out 78, which at such time is in operative position to hold the corresponding pawl 76 out of action (as indicated in full lines in Fig. 7). At the next oscillation of the frame 71 or 73, this 130

arm 87, pressing against the shoulder 88, moves the throw-out lever 78 so that the corresponding pawl 76 will be allowed to drop into engagement with the corresponding ratchet wheels 75, (as indicated by dotted lines in Fig. 7). As above stated, the opposite throw-out is also moved but in the opposite sense; thus, the throw-out 78 shown in Fig. 7 holds its pawl 76 out of action while the throw-out 78 shown in Fig. 9 allows its pawl 76 to act; these two throw-outs 78 are connected by the rod 80, and when the left hand one (Fig. 7) is moved to allow its pawl 76 to drop into engagement with the ratchet wheel, the right hand one (Fig. 6) is moved to the left and raises its pawl 76 out of engagement with the ratchet wheel 75.

For the purpose of rendering inoperative the feeding-mechanism of the ribbon not in use, the machine illustrated in the drawing is provided with the following devices:— Each pawl 76 has an arm 89 extending upward beyond its pivot, and two slidable bars 90, 91 are provided, which have cam notches 92 therein arranged to coact with the extensions 89 of the pawls 76. When a notch 92 is opposite an extension 89 and the throw-out 78 corresponding to that extension allows the pawl to drop into engagement with the corresponding ratchet wheel, then that pawl may so drop; but if the bar 90 or 91 be moved so as to rock the pawl on its pivot, then that pawl may not engage with the ratchet-wheel, no matter what may be the position of its throw-out 78. By sliding the bars 90, 91 endwise, their notches 92 may always be kept opposite the extensions 89 of the pawls 76 for the ribbon in use at the printing-point and the pawls 76 for the ribbon not in use may be held out of operation. In the machine illustrated in the drawing, such sliding of the bars 90, 91 is made automatic by the following means:—A bar 93 (Fig. 2) is provided with slots 94 through which pass screws 95 which secure said bar to the top-plate or type-ring 3, whereby said bar 93 may slide endwise. These screws also pass through slots in the forward ends of bars 90 and 91, and similar screws pass through similar slots in the other ends of said bars, which are thus guided to slide in a front and back direction. The bar 93 is provided with cam-slots 96 into which pins 97 on the bars 90, 91 project as shown. Endwise motion of bar 93 thus causes endwise motion of the bars 90, 91, but the bars 90, 91 move in opposite directions on account of the arrangement of the cam slots 96. The bar 93 has two shoulders 98, 99 thereon in position to be struck by the guide-plate G, whereby the bar 93 is moved in one direction or the other, as follows:—When it is desired to use the ribbon B at the printing point, the plate G is moved along rod 49 until tooth 56 enters notch 50. If the cam 62 is in such a posi-

tion that the frames 71 and 73 occupy the positions shown in Fig. 2 the plate G, engaging the shoulder 99, moves the bar 93 to the position thereof shown in Fig. 2; or, if the cam is not in such position, the bar 93 will be shifted when the cam reaches that position in the operation of the machine. If the plate G be moved to the left to bring tooth 56 into notch 51, and cam 62 be turned to move frames 71 and 73 to their extreme left-hand positions, the plate G strikes shoulder 98 and moves the bar 93 to the left. In the first case, the bar 90 is slid rearward and bar 91 is slid forward, assuming that they do not occupy the positions shown in Fig. 2; while in the second case, bar 90 is slid forward and bar 91 is slid rearward from the positions shown in Fig. 2.

The arrangement of the various devices and mechanisms, (the adjustable guide-plate G, the ribbon-feeding mechanisms, the mechanism for throwing either ribbon-feed out of operation, etc.) is such that only the ribbon in use is fed endwise while the ribbon not in use remains substantially where it was when thrown out of use until again brought into use, so that such new use begins substantially where the previous use left off, while any ribbon may be removed and be replaced by a new one without moving or disturbing the other ribbon.

In addition to the foregoing, the plate G may be so located that neither ribbon is in use at the printing point. This may be secured in either of two ways, one by having the notches 50 and 51 so far apart and the space 57 so long that the guide-plate may reciprocate while mimeograph work is being done without moving either ribbon where a type can strike it, and the other by setting the plate G with tooth 56 in notch 52, disconnecting the rod 49 or some part of its driving-mechanism, and fixing said rod 49 in a mid-position with space 57 at the printing-point. One means for securing this latter result is shown in the drawing (Fig. 11). A slide 100, mounted on the disk 59, is adapted to engage with a tail 101 on the pawl 68 and disengage said pawl from the ratchet-wheel 63. Said slide-bar 100 is slotted and engages with the screw by which the pawl 68 is secured to the disk 59; it also has a wedge-ended flange 102 which engages with the tail 101, and a forwardly extending arm 103, by which it may be slid on said screw, and a guide-piece 104 secured to the disk 59. When pawl 68 is moved into the position shown by dotted lines in Fig. 11, the cam 62 is not moved thereafter by the spring-drum, and the rod 49 and frames 71 and 73 may be moved to a position such that space 57 is opposite the printing-point, the cam 62 being turned by hand as necessary to secure such result.

From the foregoing description, it is evi-

dent that, while the construction shown is a convenient and ready means for carrying the invention into effect, the invention is by no means limited to such a construction. The invention is to be understood, therefore, as embracing all means for effecting the result specified which fall within the spirit and scope of the claims appended hereunto.

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

1. In a printing device, the combination with means for feeding and guiding two ink ribbons, of means for bringing one or the other of said ribbons to printing position, and separate means for reversing the direction of feed of said ribbons.

2. In a printing mechanism, the combination with means for guiding and feeding two ink ribbons, of means for bringing one or the other of said ribbons to printing position, and separate automatically operated devices for reversing the feed of said ribbons.

3. In a printing device, the combination of a plurality of ink ribbons, driving means common to said ink ribbons, and separate reversing means for each ribbon, whereby the direction of feed of one of said ribbons may be reversed without reversing another.

4. In a printing device, the combination of a plurality of ink ribbons, driving means common to said ink ribbons, and separate means, each automatically controlled by its ribbon, for reversing the direction of feed of said ribbons.

5. In a printing device, the combination of a plurality of ink ribbons, means for bringing one or another of said ribbons to printing position, means for imparting a longitudinal feed to that ribbon only that is in printing position, and separate means for reversing the direction of the longitudinal feed of said ribbons.

6. In a printing device, the combination of a plurality of ribbons, means for bringing one or another of said ribbons to printing position, means for imparting a longitudinal feed to that ribbon only which is in printing position, and separate means, each controlled automatically by its ribbon, for reversing the direction of feed of said ribbons.

7. In a printing device, the combination of a plurality of ink ribbons, means for imparting a reciprocatory transverse feed to said ink ribbons in unison, means for bringing one or another of said ribbons to printing position, and means controlled by the ribbon in use and operated by said transverse feeding means for reversing the direction of feed of the ribbon in use without affecting the direction of feed of a ribbon not in use.

8. In a printing mechanism, the combination of means for reciprocating a ribbon transversely; means for feeding the ribbon longitudinally, and means operated by said

reciprocatory means for reversing the direction of the longitudinal feed.

9. In a printing mechanism, the combination of two spools and a guide for an ink ribbon, means for imparting a longitudinal feed to said ribbon, means separate from the ribbon spools for reciprocating said guide to give a cross-wise feed to said ribbon, and means controlled by said ribbon and operated by said reciprocating means for reversing the direction of longitudinal feed of said ribbon.

10. In a printing mechanism, the combination of two ribbon spools, means for guiding a ribbon from one of said spools to the other in an off-set path, the off-set portion of said path being in the printing field, means for reciprocating said guide whereby a transverse reciprocatory feed is imparted to the ribbon, means for oscillating one of said spools in unison with the motion of said guide, and means for feeding the ribbon longitudinally.

11. In a printing mechanism, the combination of two ribbon spools, a ribbon guide having two parallel oblique guide portions whereby the ribbon leaves said guide in a path parallel to but off-set from the path in which it approaches said guide, means tending to oscillate said spools, and means for holding one of said spools against motion in one direction, whereby a longitudinal feed is imparted to the ribbon.

12. In a printing device, the combination of a ribbon guide comprising oblique portions for changing the path of the ribbon, means for feeding the ribbon longitudinally, means for reciprocating said guide to impart to the ribbon a reciprocatory transverse feed, and means for moving said guide to move the ribbon into or out of the printing field.

13. In a printing mechanism, the combination with means for feeding and guiding an ink ribbon, comprising means for moving the ribbon into and out of the printing field, of means for automatically throwing said feed devices into operation when the ribbon is moved into the printing field and out of operation when the ribbon is moved out of the printing field.

14. In a printing mechanism, the combination with means for feeding and guiding a plurality of ink ribbons, said means comprising means whereby any of said ink ribbons may be moved into or out of the printing field, of means for throwing the feed devices of any ink ribbon into operation when the ribbon is moved into the printing field, and out of operation when the ribbon is moved out of the printing field.

15. In a device for imparting longitudinal feed to an ink ribbon, the combination of a ribbon spool, a reciprocatory friction device tending to oscillate said spool, and a retain-

ing device for preventing motion of the spool in one direction.

16. In a device for imparting longitudinal feed to an ink ribbon, the combination of two ribbon spools, reciprocatory friction devices tending to oscillate said ribbon spools, and a retaining device for preventing motion of one of said spools in one direction.

17. In a device for imparting longitudinal feed to an ink ribbon, the combination of two ribbon spools, reciprocatory friction devices tending to oscillate said ribbon spools, retaining devices for preventing motion of said spools in one direction, and means for throwing one of said retaining devices into operation and the other of said retaining devices out of operation.

18. In a device for imparting longitudinal feed to an ink ribbon, the combination of two ribbon spools, reciprocatory friction devices tending to oscillate said ribbon spools, retaining devices for preventing motion of each of said ribbon spools in one direction, and a reverse mechanism for automatically throwing one of said retaining devices into and the other of said retaining devices out of operation.

19. The combination with spools for a number of inking-ribbons, of oblique guides for said ribbons adjustable with relation to a single printing point to bring any of said ribbons into use thereat.

20. The combination with spools for a number of inking-ribbons, of oblique guides for said ribbons adjustable with relation to a single printing point to bring any of said ribbons into use thereat; and automatic mechanism for moving said guides to and fro during the writing in order to use transverse strips of the ribbons.

21. The combination with spools for a number of inking-ribbons, of parallel oblique guides for each ribbon adjustable with relation to a single printing point, whereby any of said ribbons may be brought into use at the printing point.

22. The combination with spools for a number of inking-ribbons, of parallel oblique guides for each ribbon, and automatic reciprocatory means with which said guides are connected adjustably, whereby any one of said ribbons may be reciprocated over a single printing point.

23. The combination of spools for two inking-ribbons mounted upon two axes, with ribbon guides swinging about said axes, and oblique guides for said ribbons near the printing point and adjustably connected with said swinging guides, whereby either ribbon may be used.

24. The combination of spools for a number of inking-ribbons, with oblique guides near the printing point for said ribbons, a reciprocatory rod with which said guides are con-

nected adjustably so that any of said ribbons may be brought to the printing point, and means for reciprocating said rod.

25. The combination of spools for a number of inking-ribbons, of adjustable oblique guides near the printing point for said ribbons, a cam, and connections whereby said cam reciprocates said guides during the writing.

26. The combination of spools for a number of inking-ribbons, with automatic reciprocatory mechanism provided with direction-changing members for said ribbons adjacent and adjustable with relation to the printing-point whereby any ribbon may be used.

27. The combination of spools for a number of inking-ribbons, with oblique ribbon guides adjustable with relation to the printing point whereby any of said ribbons may be brought to printing position, and mechanism for feeding said ribbons end-wise.

28. The combination of spools for a number of inking-ribbons, with oblique ribbon-guides adjustable with relation to the printing-point, mechanism for feeding said ribbons endwise, and mechanism for reversing the end-wise travel of said ribbons.

29. The combination of spools for two inking-ribbons mounted on the same axes for independent rotation, oblique guides for transferring the said ribbons so that the same ribbon winds on diagonally placed spools, means for oscillating the spools and reciprocating the guides, said guides being adjustably connected with said means, feed-pawls for said spools, and means for throwing out the pawls of the ribbon not in use, whereby only the ribbon in use is fed from spool to spool.

30. The combination of spools for two inking ribbons mounted for independent rotation, oblique ribbon-guides adjustable with relation to the printing-point whereby either of said ribbons may be brought to printing position, and mechanism for independently feeding said ribbons end-wise.

31. The combination of spools for two inking-ribbons mounted for independent rotation, oblique ribbon-guides adjustable with relation to the printing point, mechanism for feeding said ribbons end-wise independently, and automatic mechanism for reversing independently the end-wise travel of the said ribbons.

32. The combination of spools for two ribbons mounted for independent rotation, oblique ribbon-guides adjustable with relation to the printing point, mechanism for feeding said ribbons end-wise independently, and means for throwing out of action the feed-mechanism of the ribbon which is not in use.

33. The combination of spools for two inking-ribbons mounted for independent rotation; oblique ribbon-guides; means for recip-

rotating said guides, said guides being adjustably connected with said means; independent pawl and ratchet mechanism for actuating said spools; and automatic mechanism for throwing said pawl and ratchet mechanism one into and the other out of action.

34. The combination of spools for two inking-ribbons mounted for independent rotation, with rock-arms frictionally connected with said spools, ratchet-wheels connected with said spools, pawls for dogs for said wheels, means for each ribbon for throwing either of its pawl into and the other out of action, oblique ribbon-guides, a bar connecting said rock arms, adjustable connection between said bar and said guides, and automatic mechanism for moving and holding out of action the pawls for the ribbon not in use independently of said throwing-out means.

35. The combination of spools for two inking-ribbons mounted on two axes for independent rotation, means for turning over each ribbon adjacent to the printing-point, pivoted arms frictionally connected with said spools to oscillate the same, a bar connecting said arms, said turn-over means being moved by and being adjustable along said bar, and mechanism for turning said spools to wind the ribbons from one to the other of the spools therefor.

36. The combination of spools for two inking-ribbons mounted on two axes for independent rotation, means for turning over each ribbon adjacent to the printing point, pivoted arms frictionally connected with said spools to oscillate the same, a bar connecting said arm, said turn-over means being moved by and being adjustable along said bar, and mechanism for turning said spools to wind the ribbons from one to the other of the spools therefor, with automatic mechanism for throwing out of operation the winding mechanism of the ribbon not in use and bringing into operation that of the ribbon in use.

37. The combination of spools for two inking-ribbons mounted on two axes for independent rotation, means for turning over each ribbon adjacent to the printing point, pivoted arms frictionally connected with said spools to oscillate the same, a bar connecting said arms, said turn-over means being moved by and being adjustable along said bar, and mechanism for turning said spools to wind the ribbons from one to the other of the spools therefor, with automatic mechanism for throwing out of operation the winding-mechanism of the ribbon not in use and bringing into operation that of the ribbon in use; and means for automatically reversing the winding of each ribbon.

38. The combination of spools for two inking-ribbons mounted on two axes for independent rotation; means for turning over

each ribbon adjacent to the printing point, said means being adjustable to and fro; means for moving said ribbons longitudinally independently; and automatic mechanism for throwing out of operation the longitudinally moving means of the ribbon not in use and for bringing into operation the like means of the ribbon in use.

39. The combination of spools for two inking-ribbons mounted on two axes for independent rotation; means for turning over each ribbon adjacent to the printing-point, said means being adjustable to and fro; means for moving said ribbons endwise independently; automatic mechanism for throwing out of operation the end-wise moving means of the ribbon not in use and bringing into operation the like means of the ribbon in use, and means for automatically reversing the direction of said end-wise travel of said ribbons.

40. The combination of spools for two inking-ribbons mounted on two axes for independent rotation; oblique parallel guides for each ribbon adjacent to the printing-point, whereby each ribbon is turned over, said guides being bodily adjustable with relation to the printing-point, means for winding each ribbon independently from one to the other of its spools; and automatic mechanism for throwing out of operation the winding-means of the ribbon not in use.

41. The combination of spools for two inking-ribbons mounted on two axes for independent rotation; oblique parallel guides for each ribbon adjacent to the printing-point, whereby each ribbon is turned over, said guides being bodily adjustable with relation to the printing-point; means for winding each ribbon independently from one to the other of its spools, and automatic mechanism for throwing out of operation the winding-means of the ribbon not in use, with means for automatically reversing the end-wise travel of said ribbons.

42. The combination of spools for two inking-ribbons mounted on two axes for independent rotation, oblique parallel guides for each ribbon adjacent to the printing point, rock-arms frictionally connected with said spools, a bar connecting said arms, means for connecting said guides adjustably along said bar, and mechanism for rotating said spools to wind the ribbons from one to the other of the spools therefor.

43. The combination of spools for two inking-ribbons mounted on two axes for independent rotation; oblique parallel guides for each ribbon adjacent to the printing point; rock-arms frictionally connected with said spools; a bar connecting said arms; means for connecting said guides adjustably along said bar; and mechanism for rotating said spools to wind the ribbons from one to the other of the spools therefor, with means for

automatically throwing out of operation the winding mechanism of the ribbon not in use when shifting said guides to change ribbons.

44. The combination with a ribbon-spool and a ratchet wheel thereon, of means for oscillating or rocking said spool and wheel, and a retaining pawl pivoted on a fixed axis and co-acting with said ratchet wheel.

45. The combination with spools for two inking-ribbons mounted for independent rotation, of ratchet wheels on said spools; means for oscillating or rocking said spools and ratchets; pawls pivoted on fixed axes and adapted to co-act with said ratchet wheels; and means for bringing either ribbon into use at the printing point.

46. The combination with spools for two inking-ribbons mounted for independent rotation; ratchet wheels on said spools; means for oscillating or rocking said spools and ratchets; pawls pivoted on fixed axes and adapted to co-act with said ratchet wheels; means for bringing either ribbon into use at the printing point; and means for disengaging the pawls of the ribbon not in use; whereby only the ribbon in use is moved end-wise.

47. The combination with spools for two inking-ribbons mounted upon two axes, one spool for each ribbon on each of said axes of parallel oblique guides for each ribbon, and rocking arms with which said guides are adjustably connected.

48. In a printing mechanism, the combination of means for guiding a plurality of ink-ribbons; two spools for each of said ribbons; a pawl for each of said spools; and means for bringing one only of said pawls into operation at a time.

49. In a printing mechanism, the combination of a guide for guiding an ink ribbon past the printing-point; spools for said ink-ribbon; and means for imparting a to and fro motion to said guide and for rocking said spools about their axes in unison with such to and fro motion.

50. In a printing mechanism, the combination of two ribbon spools; two rock frames, one adapted to oscillate concentrically with each of said spools; and a ribbon guide connected to both of said rock frames so as to move to and fro as the said frames are rocked.

51. In a printing mechanism, the combination of two ribbon spools; two rock frames, one adapted to oscillate concentrically with each of said spools; a ribbon guide connected to both of said rock frames so as to move to and fro as said frames are rocked; and means tending to oscillate each of said spools in unison with its rock frame.

52. In a printing mechanism, the combination of two ribbon spools; pawls coöperating with said spools to afford a longitudinal feed to the ribbon; a member having a to and fro motion; and means controlled by the

ribbon and operated by said member for throwing one of said pawls into and the other of said pawls out of operation.

53. In a typewriting machine, the combination of ribbon spools; means for feeding the ribbon from one spool to the other; a turning-bar guide between the spools; means for reciprocating the guide during the writing so as to utilize the ribbon transversely of its length; and means connected with said reciprocating means for reversing the longitudinal feed of the ribbon.

54. In a printing mechanism, the combination of spools and a guide for an ink ribbon; means for imparting a longitudinal feed to said ribbon; means for reciprocating the guide in the general direction of the travel of the ribbon during the course of the writing to give a cross-wise feed to said ribbon; and means controlled by said ribbon and operated by said reciprocating means for reversing the direction of longitudinal feed of said ribbon.

55. In a printing device, the combination of a plurality of ink ribbons; driving means common to said ink ribbons; separate reversing means for each ribbon whereby the direction of feed of one of said ribbons may be reversed without reversing another; turning-bar guides for the several ribbons; means for shifting said guides so as to bring one or another of the ribbons to the printing point; and means for reciprocating said guides during the writing so as to utilize the ribbon in use transversely of its length.

56. In a printing mechanism, the combination of spools for a plurality of ink ribbons; means for imparting a longitudinal feed to said ribbons; means for guiding each of said ribbons intermediate its spools; means operating during the course of the writing to reciprocate said guiding means in the general direction of travel of the ribbon to utilize the ribbon in use transversely of its length; and means controlled by each of said ribbons and operated by said reciprocating means for reversing the longitudinal feed of the ribbon in use.

57. In a writing machine, the combination with means for feeding two ink ribbons, of reversely arranged guides or turning bars for the two ribbons so disposed as to cause one ribbon to cross the other.

58. In a writing machine, the combination with means for feeding two ink ribbons, of reversely arranged guides or turning-bars for the two ribbons so disposed as to cause one ribbon to cross the other; and an interposed shield where the ribbons cross.

59. The combination with two ink ribbons, of reversely arranged means for turning said ribbons, the turned portions of the ribbons where the types strike running in parallel paths and being so arranged that one ribbon may be brought to the printing point

by a movement of the guide in one lateral direction and the other ribbon may be brought to the printing point by a lateral movement in the opposite direction.

5 60. The combination with two ink ribbons, of two parallel oblique guides for each ribbon, the oblique guides for one ribbon being at an angle with those for the other ribbon, and the two ribbons being guided parallel with each other.

10 61. The combination with means for feeding two ink ribbons, of guiding means for said ribbons comprising two parallel turning-bars near the printing point for each ribbon, the turning bars for one ribbon being at an angle with those for the other.

15 62. The combination with means for feeding two ink ribbons, of a guide plate near the

printing point having two parallel oblique turning bars for each ribbon, the turning- 20 bars for one ribbon being at an angle with those for the other.

63. In ink ribbon mechanism, the combination of means for feeding two ribbons, and a guide plate near the printing point adapted 25 to guide said ribbon in parallel off-set paths and so arranged as to cause said ribbons to cross.

Signed at Syracuse, in the county of Onondaga and State of New York this first day 30 of June A. D. 1904.

ALEXANDER T. BROWN.

Witnesses:

H. A. CARHART,

C. E. TOMLINSON.