

No. 816,311.

PATENTED MAR. 27, 1906.

H. C. GAMMETER.
DUPLICATING MACHINE.
APPLICATION FILED MAR. 7, 1903

3 SHEETS—SHEET 1.

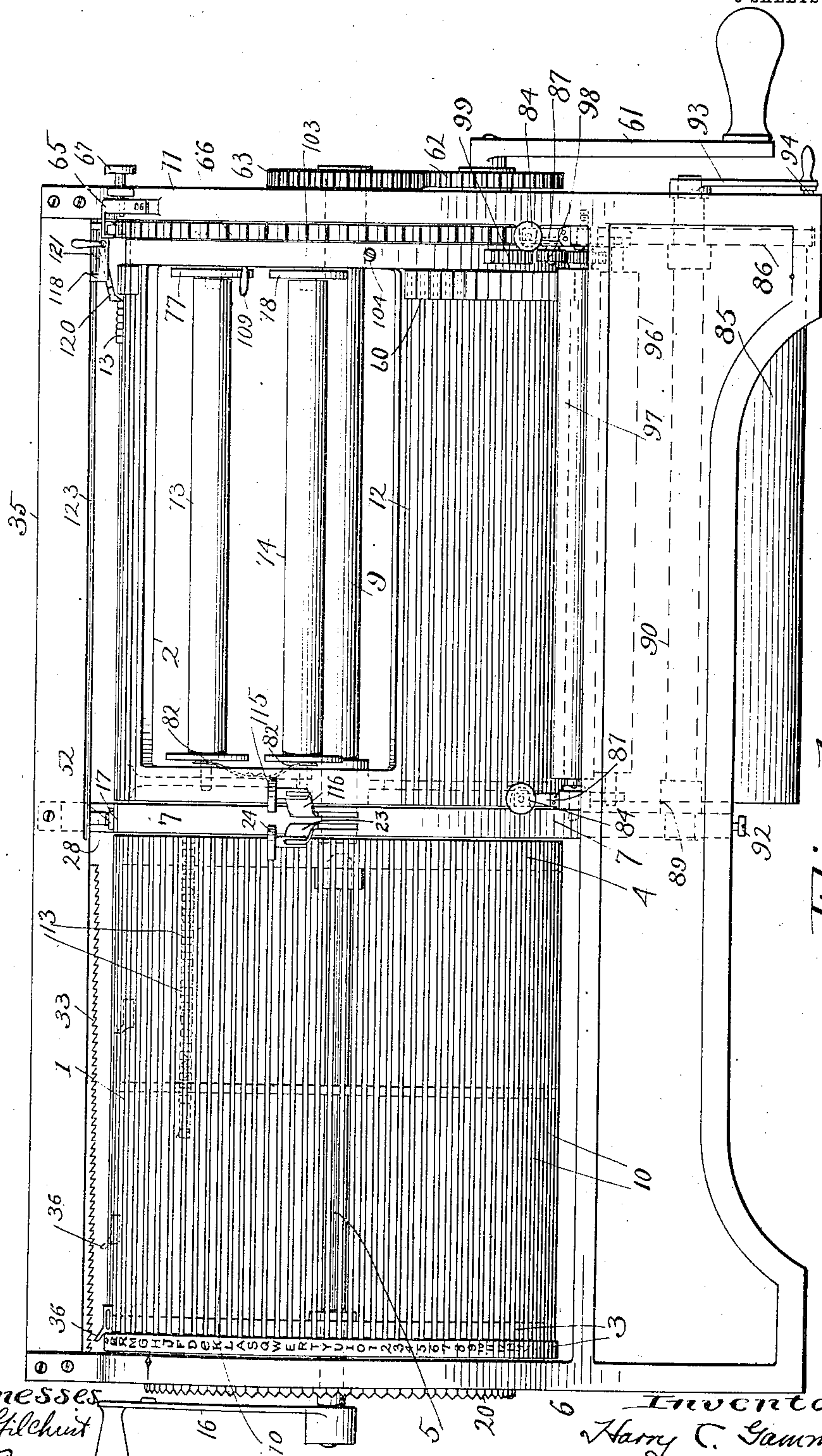


Fig. 1.

Witnesses
E. B. Gilchrist
N. L. Greenan

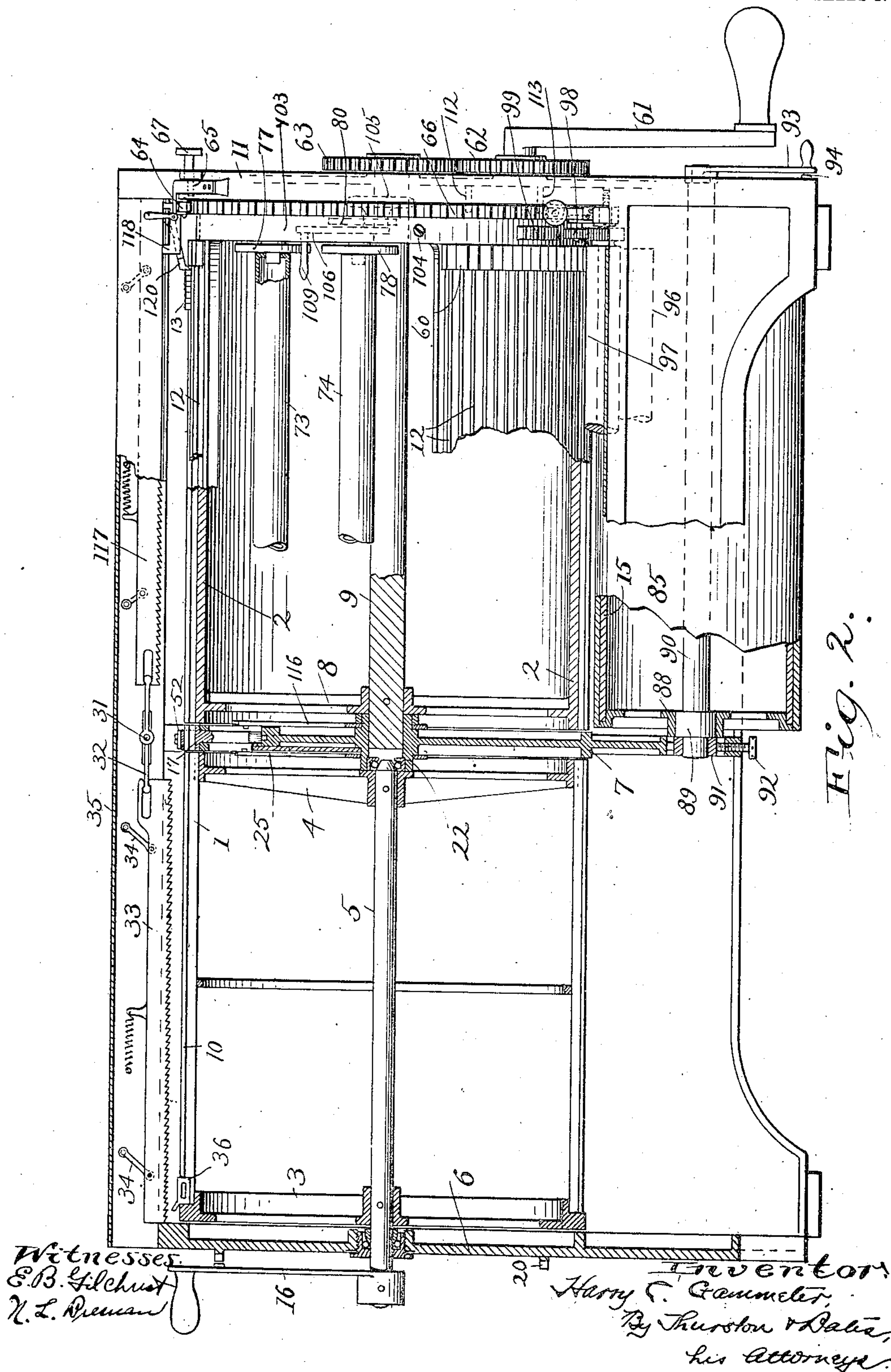
Inventor,
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By His Attorneys,
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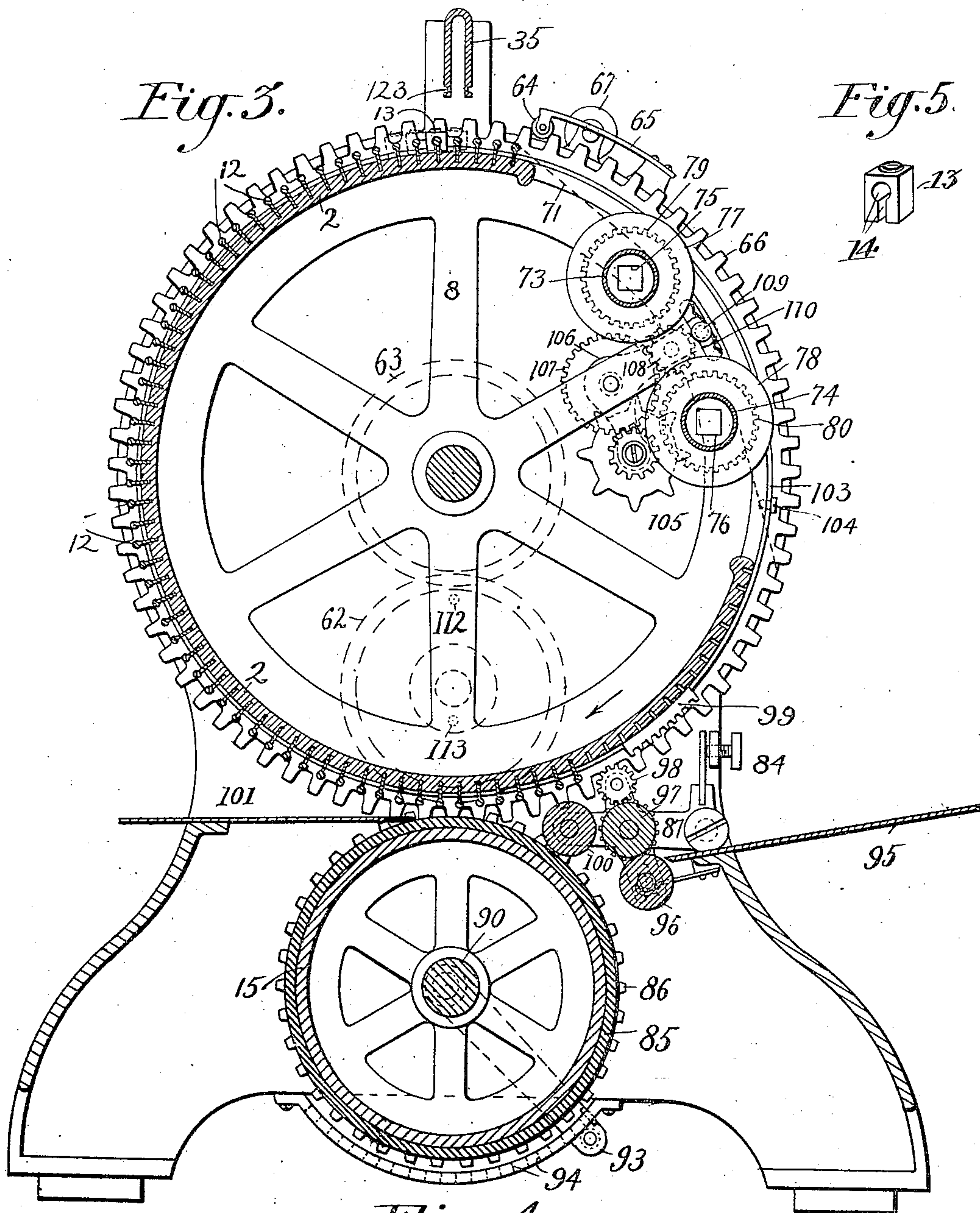


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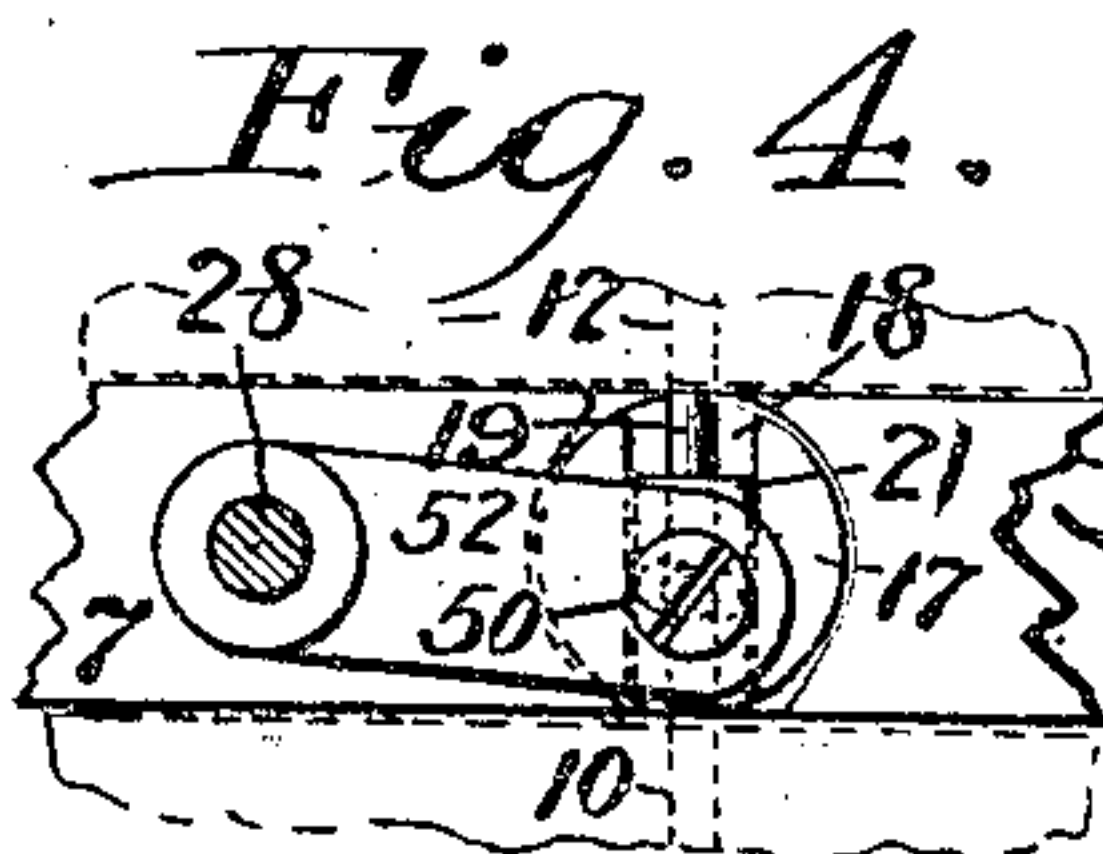
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3 SHEETS—SHEET 3.



Witnesses.
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 By his Attorneys,
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UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF CLEVELAND, OHIO, ASSIGNOR TO THE
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DUPLICATING-MACHINE.

No. 816,311.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed March 7, 1903. Serial No. 146,651.

To all whom it may concern:

Be it known that I, HARRY C. GAMMETER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Duplicating-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide an efficient machine for producing circular letters or similar matter in large quantities, particularly in making many copies of letters which shall have all the appearance of having been individually written upon the type-writer.

The complete machine, which is an improvement on the machine shown in my Patent No. 722,404, issued to me March 10, 1903, includes a supply-drum for containing the type arranged in lines of the same letter, a printing-drum, transferring mechanism for conveying the type individually from the supply-drum to the printing-drum to make words and spaces, and for distributing it from the printing-drum to the supply-drum, and a pair of finger-keys for operating the transferring mechanism accordingly. After the type has been assembled on the printing-drum an inked ribbon is placed around it and the drum is continuously rotated, the paper to be printed being automatically fed between it and an impression-platen. The features of assembling type and distributing type are covered in my application, Serial No. 196,840, filed March 7, 1904, (and renewed as No. 297,447,) and the automatic paper-feeding is covered in my Patent No. 812,735, issued February 13, 1906.

The present application is concerned with the inking-ribbon spools and their driving mechanism. For a clearer understanding of the machine, however, I will describe other parts of the complete machine as shown in the drawings.

In the drawings, Figure 1 is a side elevation of a complete machine embodying the present invention, except that the feed-table and the inking-ribbon are omitted. Fig. 2 is a side elevation, partly broken away and partly in central section. Fig. 3 is a cross-section through the printing-drum. Fig. 4 is a detail in plan, showing the transfer mem-

ber. Fig. 5 is a perspective view of one of the printing-type.

The supply-drum as a whole is designated 1, and the printing-drum 2. They are arranged so that the type ordinarily stored on the supply-drum may be transferred as desired to the printing-drum. A satisfactory way to do this is to have the two drums arranged as shown in the drawings, wherein they are of the same periphery and are placed with their axes in alinement. The drum 1 consists of a series of bars 10, mounted longitudinally around spiders 3 and 4, secured to a shaft 5, which is journaled in the uprights 6 and 7 of the frame.

The printing-drum has a body portion, (designated 2,) which is a portion of a cylinder, preferably about three-quarters. Inward flanges or spiders 8 on this body portion secure the drum to a shaft 9, which is mounted in the vertical standards 7 and 11 of the frame. Into radial grooves in the peripheral wall of the drum 2 are set the rails 12, having enlarged and rounded outer edges, these rails being similar to the rails 10, which constitute the periphery of the drum. The type 13 are of the form shown in Fig. 10, having across them holes 14 communicating with their feet. The type are thus slipped over the various rails 10 and are normally retained thereon. This form of rail and type I have found to be especially satisfactory in practice.

When it is desired to assemble on the printing-drum 2 the matter to be printed, the supply-drum is rotated until the rail 10, carrying the proper letter, comes into a certain position—namely, the uppermost position in the machine shown—whereupon the drum is locked and the type is shifted to the printing-drum. Then the supply-drum is turned to bring the next letter into alinement, and this is shifted to the printing-drum, and so on. As soon as a complete line is thus set up on one of the rails 12 of the printing-drum this drum is turned to bring another rail into position. In this manner type for a whole page is set up on the periphery of the drum.

As hereinafter more fully explained, an inked sheet of fabric or ribbon is now wrapped around the drum over the type, and the printing-drum is then continuously rotated by a crank, operating to print on paper drawn

between the printing-drum and the impression-roll 15 beneath it.

As shown in the drawings, the supply-drum 1 is turned to the positions desired by the crank 16, secured on its end, the proper position being shown, as indicated by letters on the periphery of the spider 3. The drum is locked by forcing inward slightly the handle of the crank 16, which causes a lug thereon to engage in the notches 20 on the standard itself. This locks the supply-drum with a rail carrying a supply of type, all of the same letter, in alignment with the transfer member. This transfer member consists of a rotatable head 17, having across it a recess 18, from the base of which rises a rail 19 of the same character as the rails 10 and 12. On this rail is a small slideable block 21 of less length than the width of the head, so that there is left beyond the block a space within the head sufficient for the reception of a single type.

Journalled on a frame-boss 22 concentric with the drums is a ball-crank lever 23, which has at its forward end a finger-key 24 and extends in an upward direction from the boss in the form of a flat plate 25. This plate is connected by suitable intermediate mechanism with the transfer member and with the combs 33 and 117. The particular form of the connection is immaterial to the present invention and is not herein shown or described. A satisfactory form thereof is fully set out in my application, Serial No. 196,840, filed March 7, 1904, referred to. Suffice it to say that a depression of the key 24 through its connection gives a partial rotation to the shaft 28, which operates a pin 31, and thereby, by means of a link 32, draws toward the printing-drum the toothed bar 33.

The toothed bar 33 is carried in a suitable manner, as by a pair of angularly-extending links 34 within a frame-piece 35 of an inverted-U shape, the pin 31 extending through such rear side. Now when the movement just described draws the toothed bar 33 toward the printing-drum such bar swings downward and its teeth catch in the upwardly-projecting end of a follower 36, which rides on the rail 10 behind the line of letters thereon. This movement shifts the whole line of letters toward the printing-drum the thickness of one type, causing the foremost type on the supply-drum to pass into the space in the head 17 in front of the block 21.

As soon as the type has passed into the head 17 behind the block 21 therein the continued depression of the key-lever operates, by reason of the gearing between it and the stem of the head, to rotate the head half a revolution to bring the type into alignment with the printing-drum and in advance of the block. Then a further depression of the key-lever (operating through a sleeve surrounding the shaft 28 and having an arm 52 connected by a pin with the block 21) shifts that

block sufficiently to shove the type off of the rail 19 in the head and onto the aligned rail 12 of the printing-drum. Thus assembling a line of type comprises turning the crank 16 backward or forward successively to bring the proper supplies of type into position and after each positioning of the crank depressing the key-lever 24 to transfer the end type from the supply-drum to the printing-drum. Margin-blocks 60, fitting the rails 12 somewhat more snugly than the type, hold the assembled lines at one end. The other end is held by snugly-fitting spaces (blank type) normally carried on a slightly lighter rail 10 on the supply-drum and transferred from the supply-drum at the end of the line.

When one line has been set up on the printing-drum, a new rail 12 is brought into alignment by turning the printing-drum. The printing-drum is turned by a crank 61, having on its hub a gear 62 meshing with a gear 63 on the shaft 9. A detent-roller 64, pressed by a spring 65 between the teeth of a gear 66 around the periphery of the printing-drum, aligns it with the supply-drum and also prevents any accidental displacement of the printing-drum. This detent-roller may be thrown out of engagement by turning the head 67, which has an eccentric-rod on which the spring bears.

The sheet of inked fabric, which is really a long wide ribbon 71 of the full width of the page, is carried by a pair of spools 73 and 74, which are hollow tubes having ends with square holes in them by which they fit over the square studs 75 and 76, projecting from disks 77 and 78, which have secured to their outer faces gears 79 and 80. The ribbon extends from one of the spools completely around the assembled type-face and passes onto the other spool, the periphery of the drum 2 being open at the point where the spools are. The spools are easily removed by slightly shifting their barrels to the left against the action of springs 82 to release the barrels from the square studs 75 76. This arrangement, which is new in the present machine, is very efficient in allowing the ribbon to be easily passed around the drum after the type has been assembled thereon or removed for distributing the type.

Beneath the printing-drum 2 is an impression platen or drum 15, having on its periphery a soft padding, as rubber 85. After the type has been assembled on the printing-drum and the inking-ribbon put in place the paper is drawn between the printing-arm and impression-drum by the rotation thereof by means of the crank 61. The printing-drum drives the impression-drum by means of a gear 86 on the impression-drum meshing with the gear 66 on the printing-drum.

In order to give just the right impression notwithstanding various thicknesses of paper used, the impression-drum is adjustable.

This is accomplished by journaling its supporting-spiders 88 on circular bosses 89, which are carried eccentrically on a shaft 90, journaled in blocks 91, slidable in the frame-standards. The blocks are themselves adjusted by set-screws 92. Then the impression-roller is more accurately adjusted by slightly turning the shaft 90 by means of its crank 93, which is adapted to be locked by having a lug springing into notches in a segmental guard 94. By this means, which is another important feature of the present invention, a very accurate adjustment is provided. An inspection of a trial sheet of paper shows if the impression is too hard or not hard enough, and a simple movement of the crank 93 gives the proper adjustment.

The sheets of paper to be printed are placed one after another upon the table 95, of which a portion is shown in Fig. 3, the front edge of the paper coming between the soft rollers 96 and 97, the latter being geared with a pinion 98, which is adapted to be engaged by a short rack 99, carried by the printing-drum. When this rack engages, these rollers 97 and 98 are revolved to draw the paper between them, so that it strikes the impression-drum and is drawn between it and the soft roller 100, and then between the impression-drum and printing-drum, and finally delivered onto the table 101. The rollers 96, 97, and 100 are carried by pivoted arms 87, of which one appears in Fig. 3, which arms are adjusted by set-screws 84. The pinion 98 is also carried by the arm 87. (Shown in Fig. 3.)

The rack 99, which operates the pinion 98, is formed on a band 103, which passes around the drum and may be locked at any desired point, as by the set-screw 104. It is so placed that the paper is fed between the printing and impression rolls while that portion of the printing-drum which is not carrying the type is rotating past the impression-roller. With the rack 99 in the position shown in the drawings considerable space is allowed for the blank head of the page.

The ribbon 71 is shifted slightly once for each rotation of the printing-drum at a time when the machine is not actually making an impression by means of the star-wheel 105, which is carried by a bell-crank lever 106, pivoted to the printing-drum, and is connected by a gear 107 to the pinion 108. This pinion is caused to engage with the gear 79 or the gear 80, as may be desired, by pressing the pin 109, carried by the lever, in one direction or the other, a spring 110 locking it in place. Fig. 3 shows the lever and the star-wheel mechanism in an intermediate position out of engagement with either spool. In this position the star-wheel does not engage anything in its rotation. When it is in either extreme position, however, the star-wheel for each rotation engages either the pin 112 or the pin 113, carried by the frame, and is

turned one tooth thereby. If the former, the spool 74 is rotated to wind the ribbon onto it and from the spool 73. If the latter, the reverse operation takes place, 73 being wound up

After the desired number of copies have been printed by the machine the ribbon is removed and the type is distributed from the printing-drum back onto the supply-drum by an operation which is simply the reverse of the assembling operation, viz: The printing-drum is set by the crank 61 so that the first line is in alinement with the transfer-head 17 and the supply-drum is turned to bring into alinement that rail thereon which corresponds with the end type from the assembled line.

When the supply-drum is in proper receiving position, the key 115 is depressed. This key is on a lever 116, whose operation is the reverse of the lever 23, and which therefore moves the pin 31 toward the supply-drum when the key 115 is actuated, and this draws the toothed bar 117 in that direction, and this toothed bar engages a tooth 121 on the follower 118, supported by the grooved trackway 123 on the frame member 35. The follower has a pawl 120 wherefore the movement of the follower shoves the whole line to the left, shoving the end type into the head 17, after which the further depression of the key rotates the head to turn the type into alinement with the rail of the supply-drum.

The removable ribbon-spools, the feeding of the ribbon, and the adjustment of the impression-platen to give just the right impression irrespective of the thickness of the paper or the amount the ribbon may have been worn are the features covered in this application. In the form shown they have been demonstrated to be very efficient; but modifications thereof may be made within the scope of my invention as set out in the claims herein.

I claim—

1. In a duplicating-machine, the combination of a printing-drum adapted to carry rows of type on its surface, a pair of spools carried by said drum and adapted to carry a ribbon passing around the printing-face, mechanism for driving one of said spools to feed the ribbon, said spool being separable from the driving mechanism, and a spring for causing engagement therewith, substantially as described.

2. In a duplicating-machine, the combination of a printing-drum having a recess therein, a pair of spools mounted in said recess, and adapted to carry a ribbon passing around the drum, mechanism for driving either spool to feed the ribbon in either direction, said spools being separable from their driving mechanism, and means for holding them in engagement therewith, substantially as described.

3. In a duplicating-machine, the combination of a printing-drum having a recess therein, a pair of longitudinal spools mounted in said recess and adapted to carry a ribbon for the printing-drum, a rotatable driving mechanism carried by the drum with which one of the spools engages at one end, and a spring bearing against the other end of the spool and tending to keep it in such engagement, substantially as described.

4. In a duplicating-machine, the combination of a printing-drum adapted to carry rows of type on its surface, a pair of spools carried by said drum and adapted to carry a ribbon passing around the printing-face, one of said spools consisting of a body and a head separable therefrom, and a spring tending to cause engagement between said body and head, substantially as described.

5. In a duplicating-machine, the combination of a printing-drum adapted to carry rows of type on its surface, a pair of spools carried by said drum and adapted to carry a ribbon passing around the printing-face, said spools each consisting of a body and a head separable therefrom, springs tending to cause engagement between said bodies and heads, and means for turning said heads as the drum is rotated to feed the ribbon, substantially as described.

6. In a duplicating-machine, the combination of a printing-drum adapted to carry

rows of type on its surface, a pair of spools carried by said drum and adapted to carry a ribbon passing around the printing-face, one of said spools consisting of a body and a head separable therefrom by means of an angular-shank connection between the body and the head, and means for automatically turning the head as the drum rotates, substantially as described.

7. In a duplicating-machine, the combination of a printing-drum, a pair of spools carried by said drum and adapted to carry a printing-ribbon passing around the drum, gears on said spools, an intermediate gear adapted to engage with the gear on either spool, gearing for driving said intermediate gear and including a star-wheel, a pair of stationary pins with either of which said star-wheel may engage, one on one side of the wheel and one on the other, a bent lever pivoted to one of the arms of the drum, and having on one arm said intermediate gear and on the other arm said star-wheel, and a handle secured to one of said arms for shifting it, substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HARRY C. GAMMETER.

Witnesses:

ALBERT H. BATES,
N. L. BRESNAN.