C. BARBIERI & J. S. THOMPSON.

PRINTING MACHINE.

APPLICATION FILED NOV. 4, 1913.

1,287,610.

Patented Dec. 17, 1918.

10 SHEETS—SHEET 1.

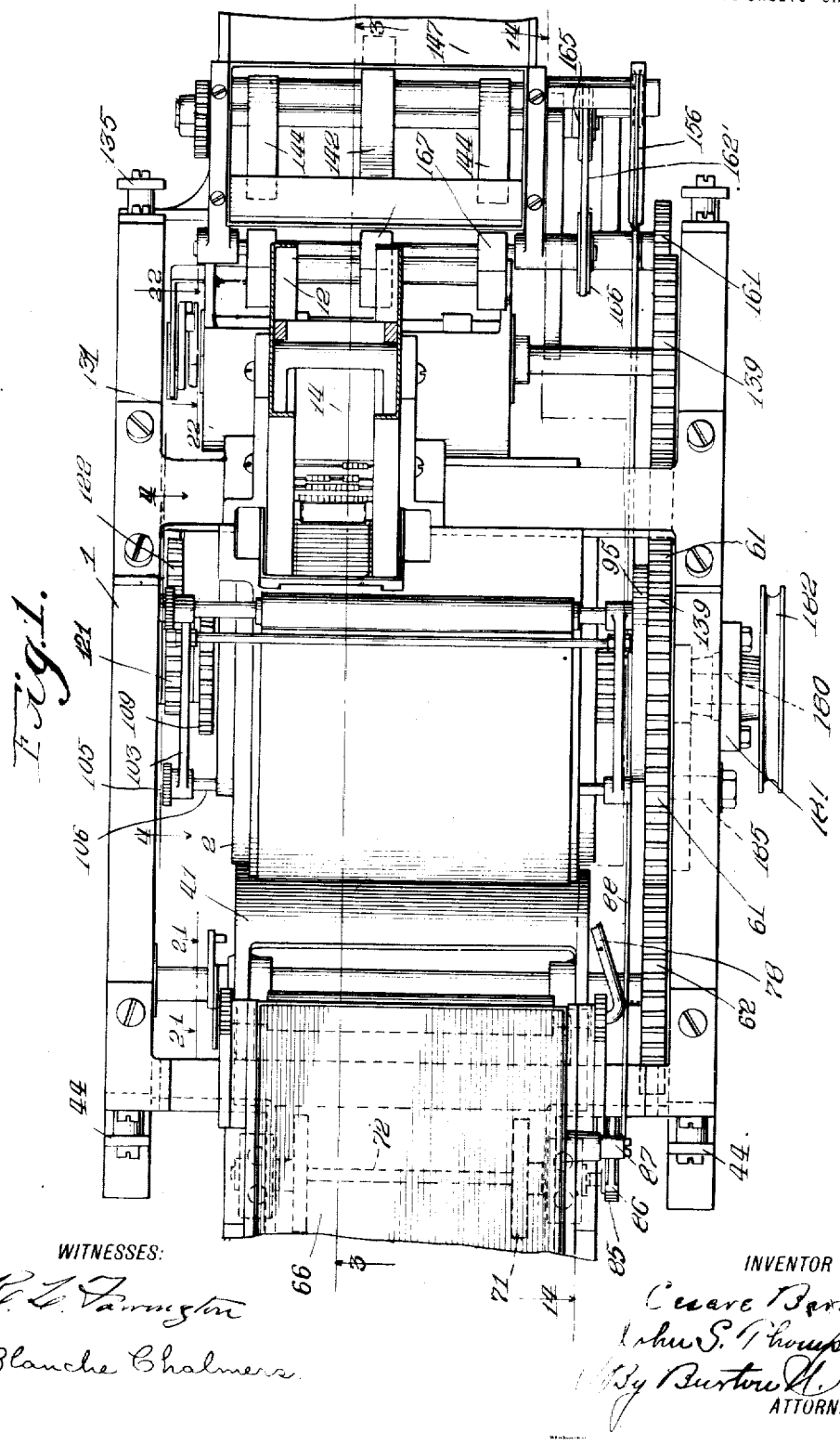


Fig. 1.

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By Burton H. Hills

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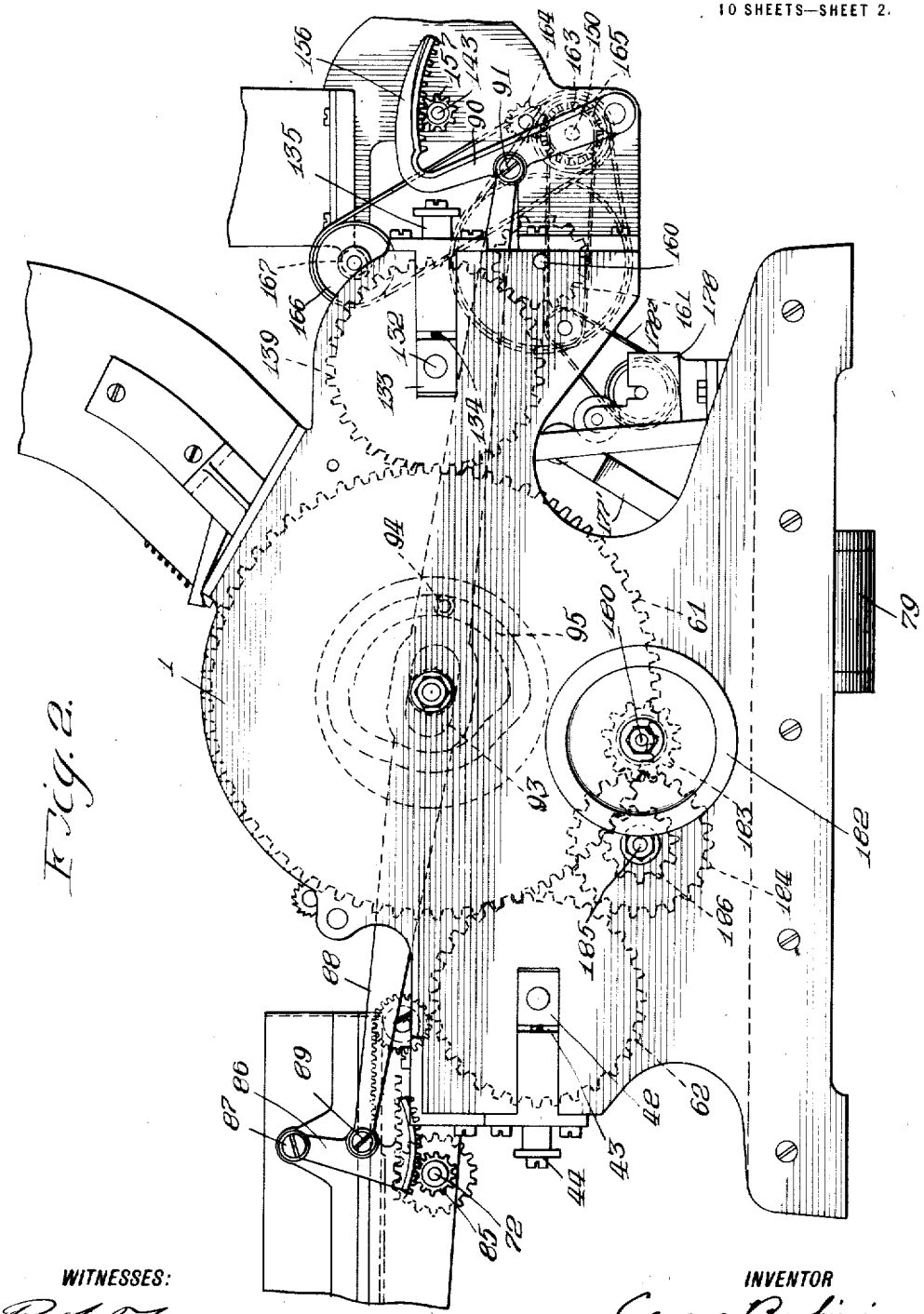


Fig. 2.

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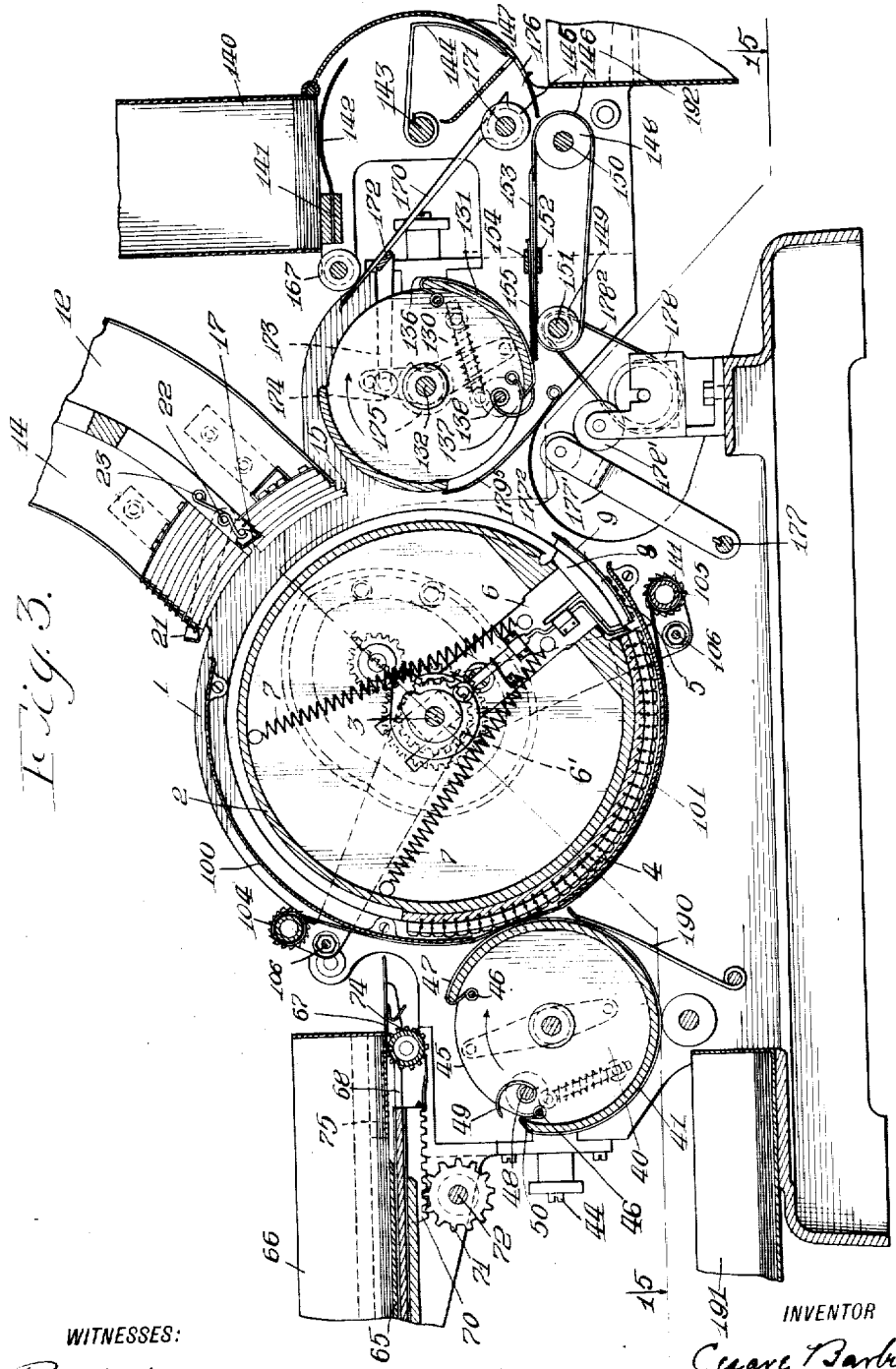


Fig. 3.

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10 SHEETS—SHEET 4.

Fig. 4.

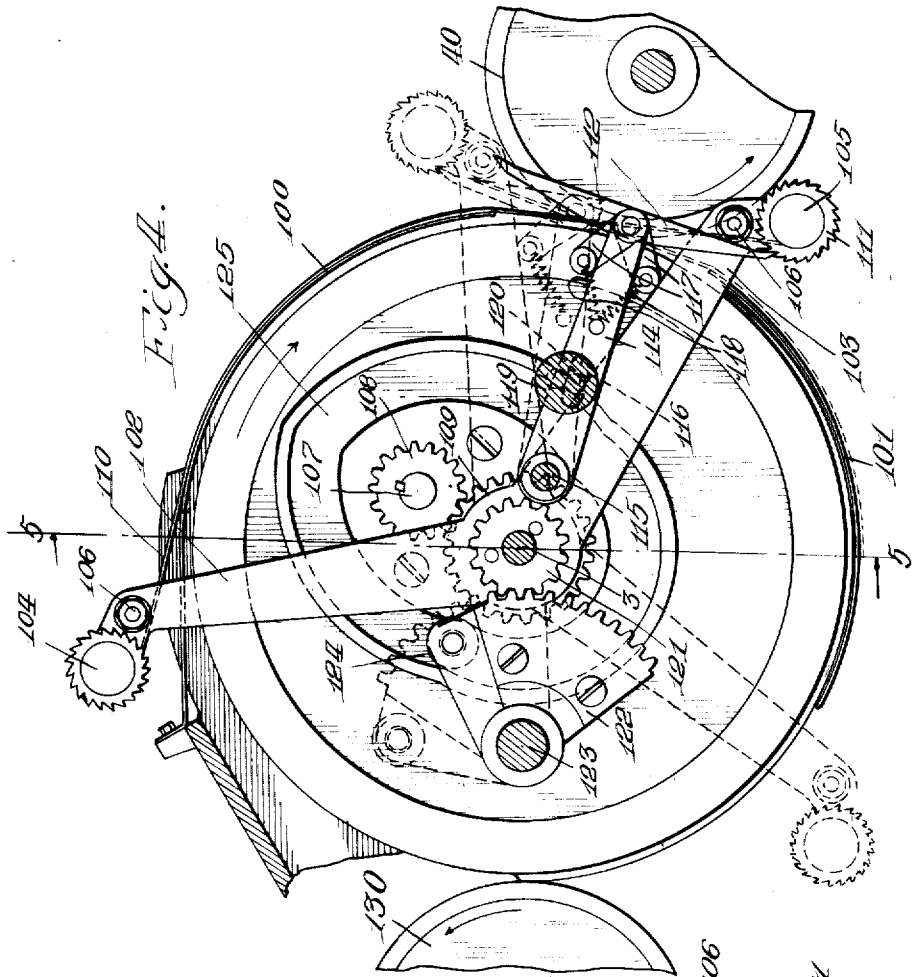
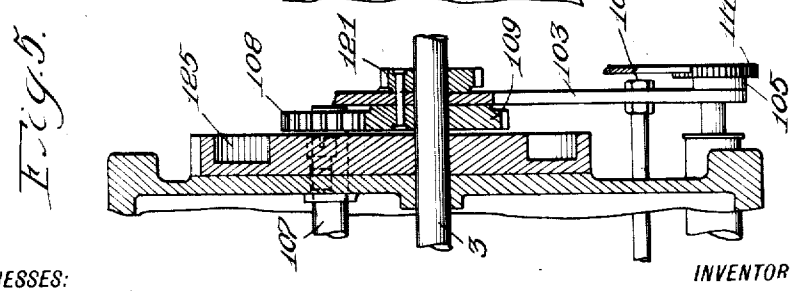


Fig. 5.



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10 SHEETS—SHEET 5.

Fig. 6.

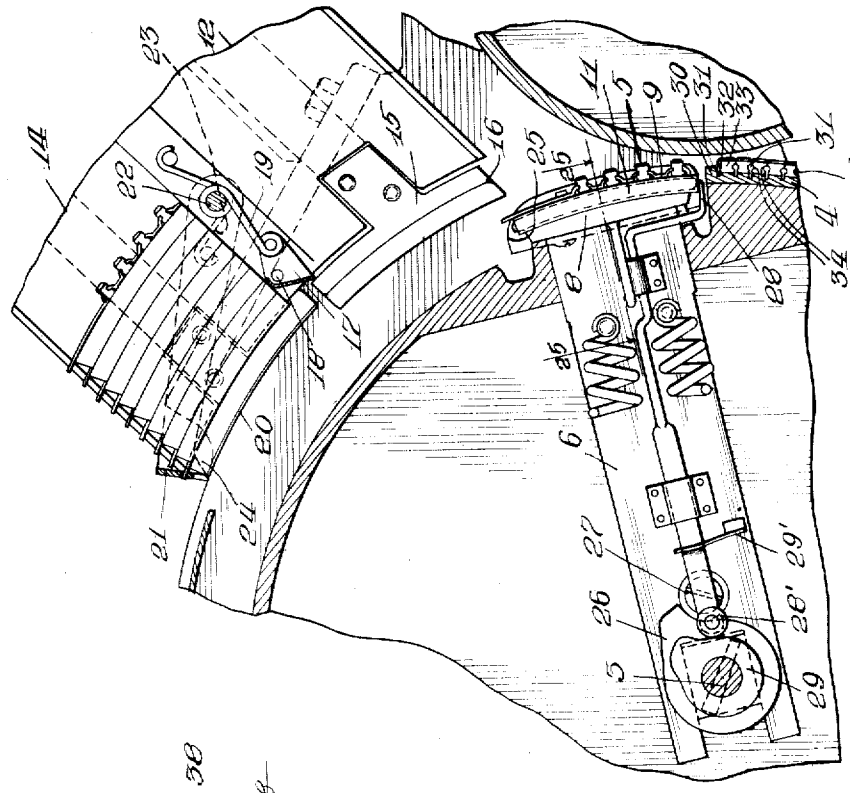


Fig. 7.

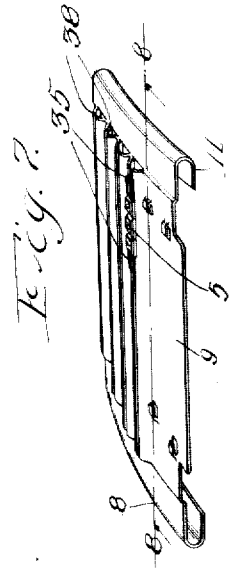
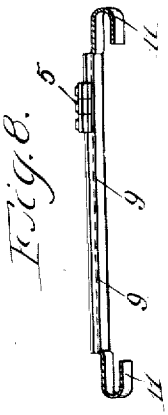


Fig. 8.



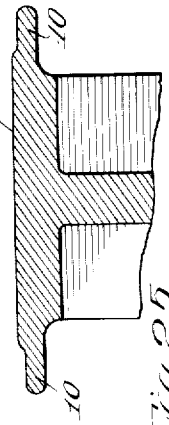


Fig. 25.

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APPLICATION FILED NOV. 4, 1913.

1,287,610.

Patented Dec. 17, 1918.

10 SHEETS—SHEET 6.

Fig. 9.

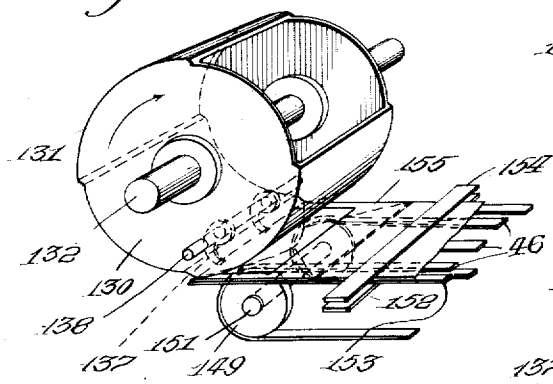


Fig. 10.

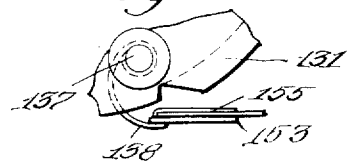


Fig. 11.

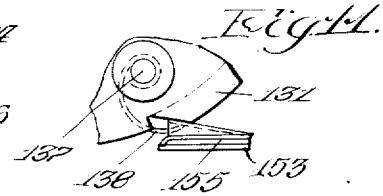


Fig. 12.

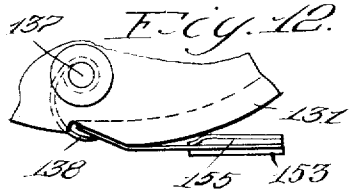
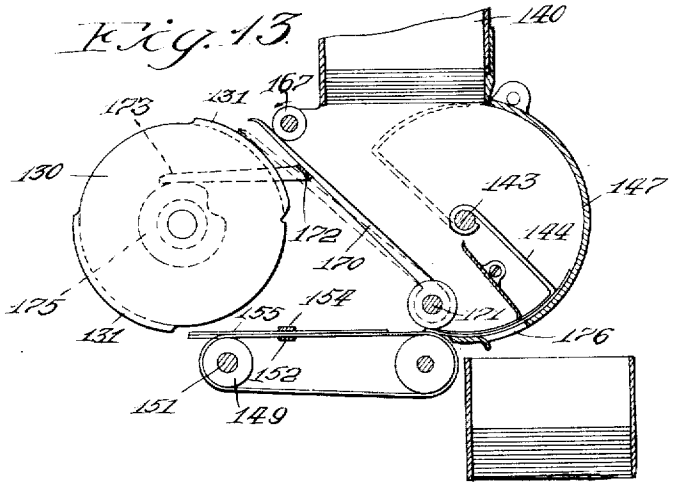


Fig. 13.



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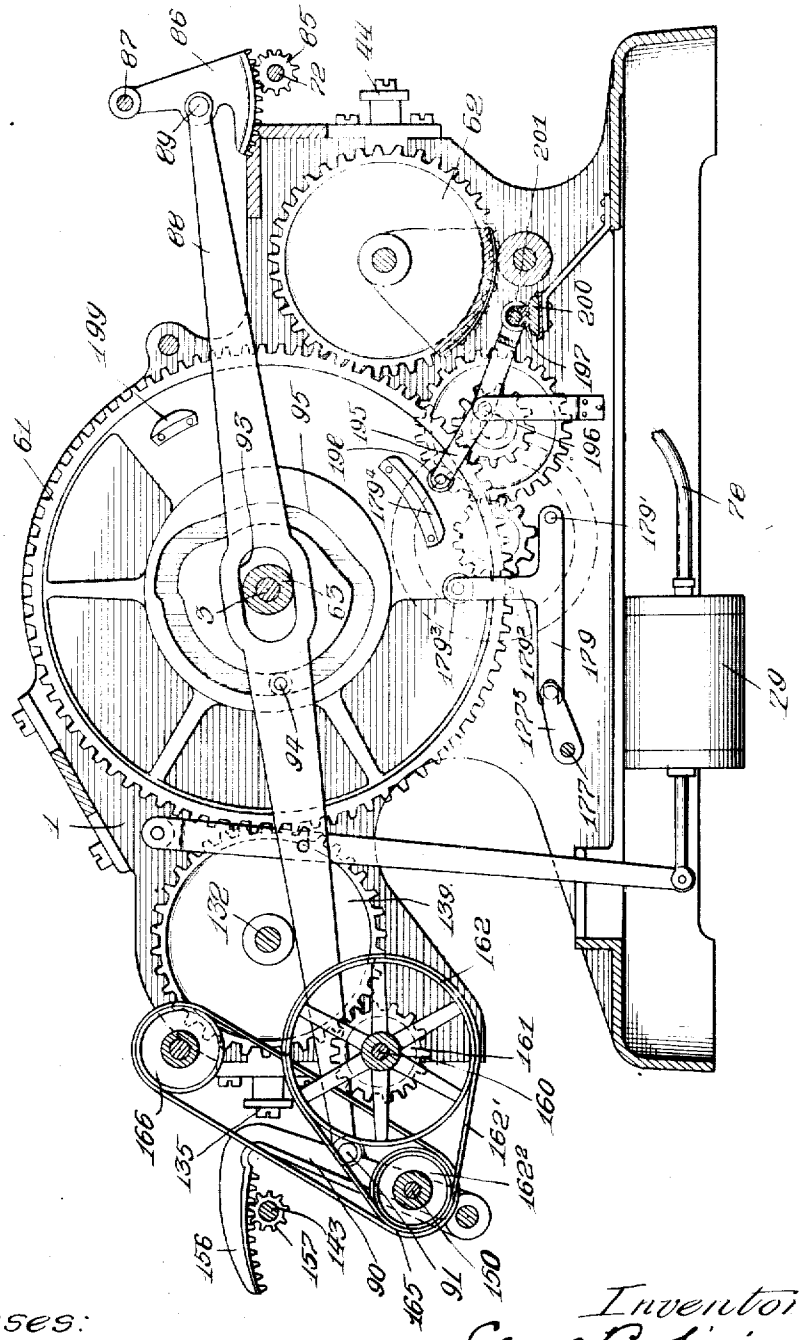
APPLICATION FILED NOV. 4, 1913.

1,287,610.

Patented Dec. 17, 1918.

10 SHEETS—SHEET 7.

Fig. 14.



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PRINTING MACHINE.

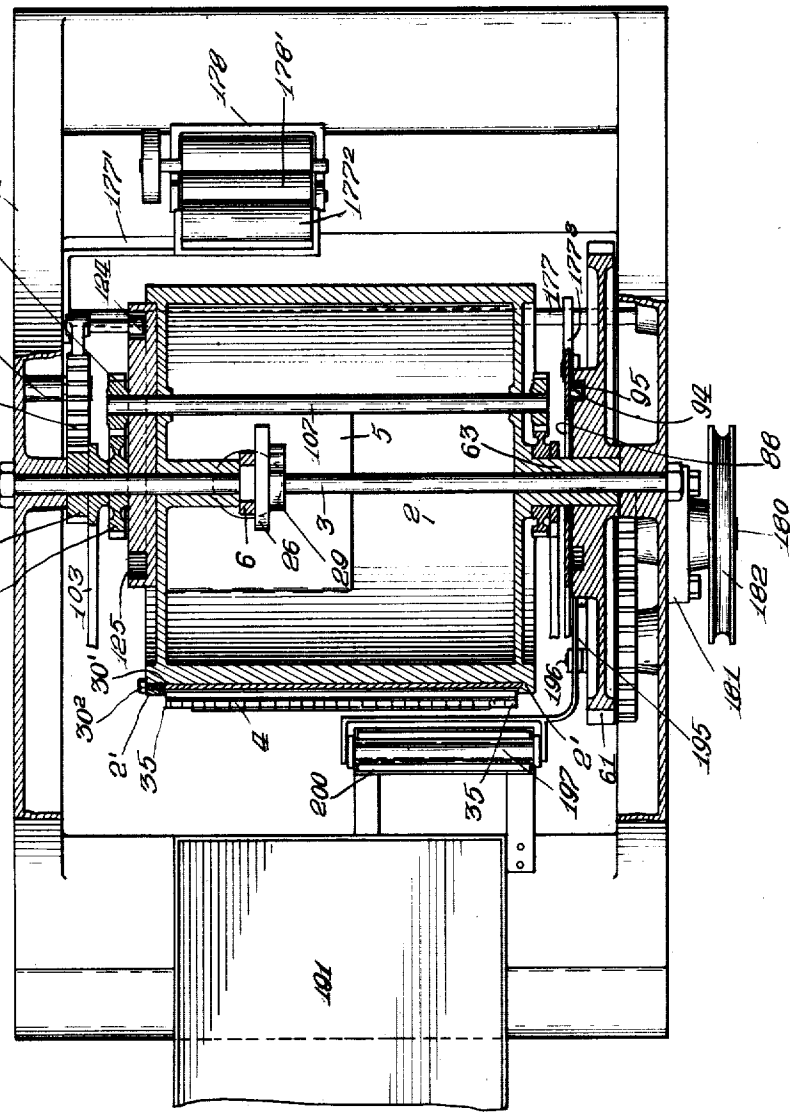
APPLICATION FILED NOV. 4, 1913.

1,287,610.

Patented Dec. 17, 1918.

10 SHEETS—SHEET 8.

Fig. 15.



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PRINTING MACHINE.

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Patented Dec. 17, 1918.

10 SHEETS—SHEET 9.

Fig. 16

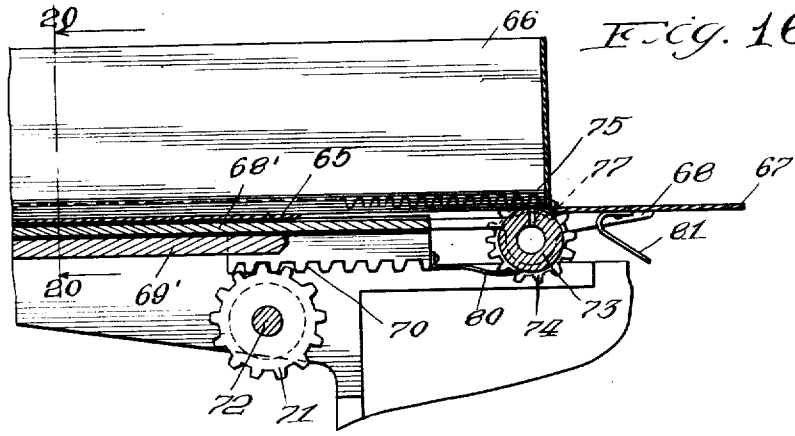


Fig. 17.

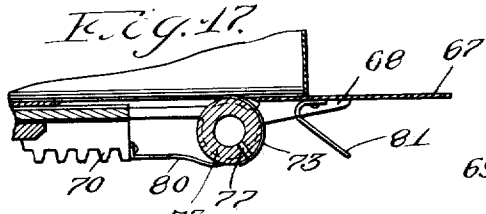


Fig. 18.

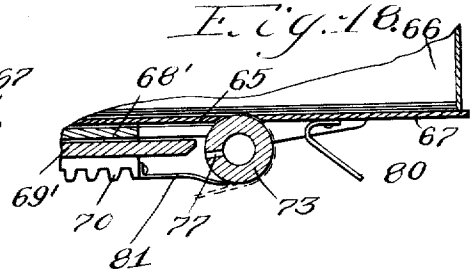


Fig. 19.

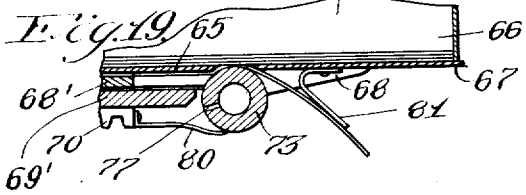
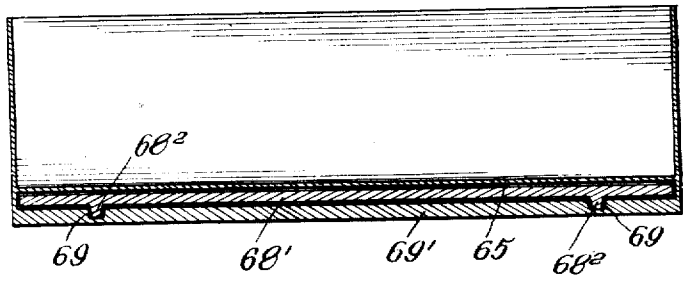


Fig. 20.



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PRINTING MACHINE.

APPLICATION FILED NOV. 4, 1913.

1,287,610.

Patented Dec. 17, 1918.

10 SHEETS—SHEET 10.

Fig. 22.

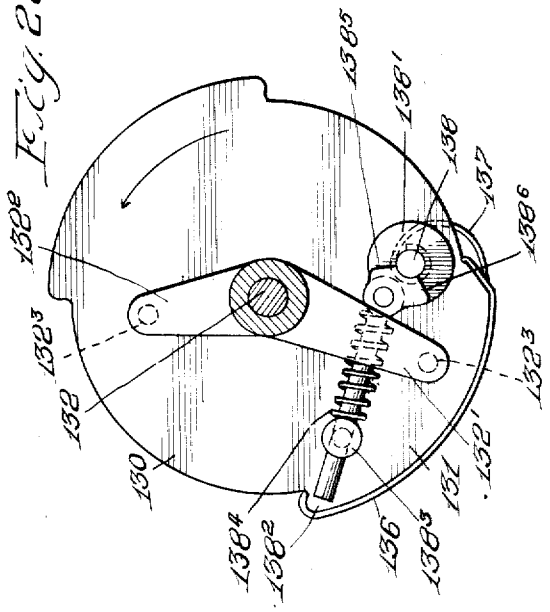


Fig. 24.

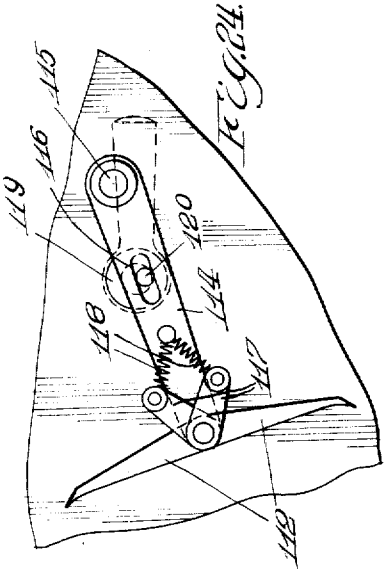


Fig. 21.

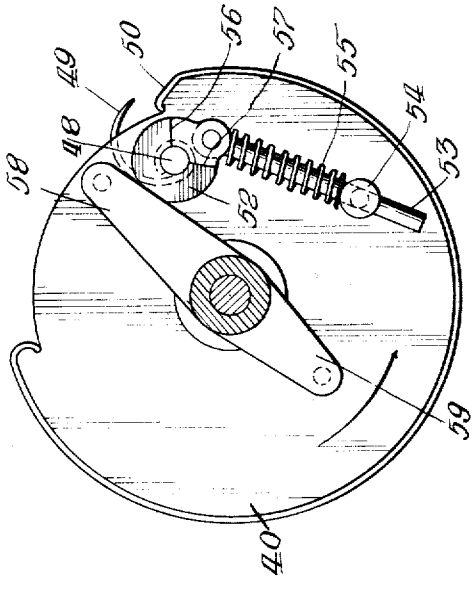
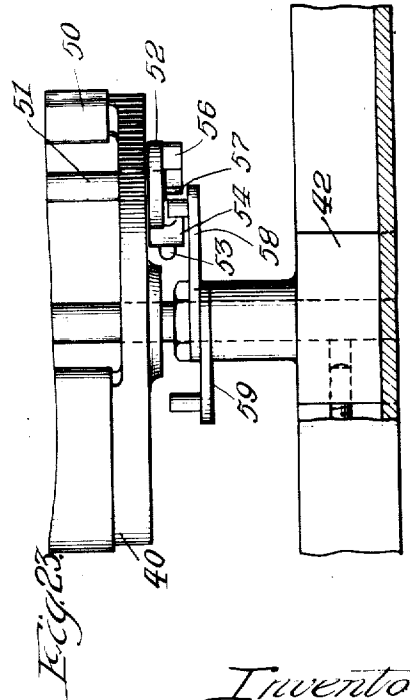


Fig. 23.



Witnesses:
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Blanche Chalmers.

Inventor.
Cesare Barbieri
John S. Thompson
By Burton A. Mills
Atty.

UNITED STATES PATENT OFFICE.

CESARE BARBIERI AND JOHN S. THOMPSON, OF CHICAGO, ILLINOIS, ASSIGNORS TO LOUIS SCHLESINGER, TRUSTEE, OF MILWAUKEE, WISCONSIN.

PRINTING-MACHINE.

1,287,610. Specification of Letters Patent. Patented Dec. 17, 1918.

Application filed November 4, 1913. Serial No. 799,244.

To all whom it may concern:

Be it known that we, CESARE BARBIERI, a subject of the King of Italy, and JOHN S. THOMPSON, a citizen of the United States, both residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Machines, of which the following is a description.

Our invention relates to that class of devices known as printing presses and the object of our invention is to provide a simple, convenient, rapid and durable device of the kind described, especially adapted for printing letters or circulars, a portion of which it is desired to maintain as a constant or fixed statement or form, while certain other portions are regularly changed, for example, in a circular letter the body portion of which remains the same for a large number of letters while the salutation or the name and address of the party for whom each letter is intended should obviously be changed for each impression.

To this end our invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings wherein like or similar reference characters indicate like or corresponding parts.

Figure 1 is a plan view of our device.

Fig. 2 is a side elevation of the same.

Fig. 3 is a section taken substantially on line 3—3 of Fig. 1.

Fig. 4 is an enlarged sectional detail taken substantially on line 4—4 of Fig. 1 showing the principal inking mechanism.

Fig. 5 is a section taken substantially on line 5—5 of Fig. 4.

Fig. 6 is an enlarged sectional detail taken on substantially the same line as Fig. 3, showing the automatic form changing mechanism.

Fig. 7 is a perspective detail view of the changeable plates.

Fig. 8 is a section taken substantially on line 8—8 of Fig. 7.

Fig. 9 is a perspective detail view of the envelop or secondary impression cylinder and associated parts of the envelop or secondary feeding mechanism.

Fig. 10 is an enlarged detail view of the envelop or secondary grippers and associated parts in position to engage an envelop.

Fig. 11 shows the same parts with the envelop engaged by the grippers.

Fig. 12 shows the parts still further advanced and the envelop partially drawn from the feeding mechanism.

Fig. 13, is an enlarged sectional view taken substantially on the same line as Fig. 3 showing the envelop feeding mechanism.

Fig. 14 is a section taken substantially on line 14—14 of Fig. 1.

Fig. 15 is a section taken substantially on line 15—15 of Fig. 3.

Fig. 16 is an enlarged detail section of the paper feeding mechanism as shown in Fig. 3 at the commencement of the feeding operation.

Fig. 17, is a similar view to Fig. 16 showing the bottom sheet drawn down and the several parts in approximately mid travel.

Fig. 18 is a view similar to Fig. 16 showing the parts at the end of their operative movement with the paper still in close contact with the separating roll.

Fig. 19 is a view with the several parts in the position shown in Fig. 18 but with the paper springing from the separating roll in position to be engaged by the grippers.

Fig. 20 is a section taken substantially on line 20—20 of Fig. 16.

Fig. 21 is an enlarged fragmentary detail section taken substantially on line 21—21 of Fig. 1.

Fig. 22 is an enlarged fragmentary detail section taken substantially on line 22—22 of Fig. 1.

Fig. 23 is a plan view of the parts shown in Fig. 21.

Fig. 24 is an enlarged fragmentary detail elevation of the pawl and its controlling mechanism employed for feeding the inking ribbon.

Fig. 25 is a section taken substantially on line 25—25 of Fig. 6.

In the drawings for the purpose of illustration we have shown our improvement arranged for printing form letters or circulars together with the envelops for mailing the same. As shown 1 is the main frame or housing of our device upon which a cylindrical rotatable bed 2 is mounted. The bed 2

may be of any desired form or construction adapted to receive a type form upon its surface and to maintain the same in proper position to produce the desired impression when in operation.

In the form shown the bed consists of a substantially regular cylinder having the portion upon which the form rests suitably finished to provide the necessary bearing surface for the form, a shaft 3 extends through the bed or cylinder 2 at its axis and is rigidly secured at both ends to suitable projections upon the frame or housing 1 with suitable bearings provided in the end walls of the cylinder or bed to loosely engage the shaft 3 and permit the free rotary movement of the bed upon the shaft.

Obviously in printing circular letters the body portion of the letter remains the same while the address and salutation must usually be changed for each letter, and for this reason in the preferred construction the type form is arranged in sections, the main or body portion 4 of the form is preferably constructed of movable type in the usual or any desired manner, although it is obvious that this portion may consist wholly or in part of half tones, engravings, stereotypes, or the like. The part 5 comprising the name of the party for whom the letter is intended with the address and salutation is separately mounted and adapted to be changed at each operative movement of the bed. Any suitable means may be provided for changing this portion of the form.

In the preferred construction shown a radial slide 6 is provided extending through the wall of the bed or cylinder 2 with a part slidably engaging a suitably formed block 6′ upon the shaft 3. A pair of springs 7—7 or other convenient means extend from the opposite wall of the bed to the slide 6 and normally retain the slide at the inner limit of its movement. A head 8 is provided at the outer end of the slide 6 of suitable form to receive a plate or carrier 9 upon which a suitable block or the several type comprising this portion of the form is mounted. In the preferred construction the head 8 is curved to correspond with the arc of the bed 2 and a suitable lip or projection 10 is provided at each end of the head. The carrier 9 is provided with projecting resilient portions 11 adapted to engage the lips 10 to resiliently maintain the carrier in position upon the head. The several parts are so formed that if the head is forced outward slightly and the carrier then held stationary while the bed is moved as in operation, the head will be withdrawn from the carrier. In the construction shown a pair of magazines 12 and 14 are provided at the periphery of the bed 2 slightly beyond the path of the head 8 radially. A pair of resilient jaws 15 are provided at the end of the magazine 12 adjacent the bed, so formed that when a carrier is positioned within the magazine the ends of the carrier will rest upon a projecting part 16 of each jaw and hold the carrier in position. Suitable means are provided for moving the slide 6 together with the head 8 and carrier 9 outward when the carrier is in proper relation to the magazine 12 whereby the carrier on the head is forced upward between the jaws 15 into suitable position to be engaged and supported thereby. When thus positioned a catch 17 which is pivotally mounted upon the walls of the magazine as at 18 engages the forward or advance edge of the carrier and prevents its further movement with the head thereby disengaging the carrier from the head and leaving the carrier in the magazine while the empty head passes onward into the lower end of the magazine 14. The magazine 14 is also provided with a pair of resilient jaws 20 with projections adapted to engage the ends of a carrier 9 to maintain the same in the path of the head 8 after depositing a carrier in the magazine 12. A movable stop 21 is also provided to engage the forward or advance edge of the lower carrier in the magazine 14 to maintain the carrier in position while the head 8 is moving into full engagement therewith. In the form shown the stop 21 is pivotally mounted upon the magazine as at 22 with a spring 23 arranged to engage and resiliently maintain the stop in engaging position. A cam face 24 is provided at each end of the stop 21 adapted to coöperate with a suitable cam 25 upon the head so that when the head is fully engaged with the carrier the cam 25 will operate to raise the stop 21 and release the carrier permitting the same to move forward with the head in printing position.

In the preferred construction a limit stop 28 is provided upon the head 8 adapted to engage the rear edge or other suitable portion of the carrier 9 to accurately locate the carrier in position upon the head. The limit stop 28 is movable upon the slide 6 and head 8 and slightly before the carrier engages the catch 17 the limit stop 28 is retracted to permit the disengagement of the head from the carrier. Any suitable means may be provided for controlling the position of the slide 6 and limit stop 28. In the form shown a cam 26 is rigidly secured to the shaft 3 adjacent the slide 6 and a suitably formed roller or other convenient means 27 is attached to the slide adapted to coöperate with the face of the cam to periodically force the slide outward against the action of the springs 7—7.

A cam 29 is also mounted upon the shaft 3 and coöperates with a suitable roller 28′ or equivalent means upon the inner end of the limit stop 28 to periodically force the stop outward and a spring 29′ or other re-

silient means extends from the stop to the slide 6 adapted to normally maintain the stop at the inner limit of its movement.

Suitable means are also provided for attaching the type to the bed 2, obviously suitably curved stereotypes, etchings or the like may be provided and attached to the bed in any suitable manner. In the form shown however, each part of the form is composed of a plurality of individual type mounted between guards or rails extending longitudinally of the bed with the foot end of each type preferably resting against the bed or upon a suitable backing material attached to the bed. In the preferred form shown the body portion 4 of the form comprises a curved plate 30 adapted to snugly fit the exterior of the bed and provided with a plurality of bars 31 extending longitudinally of the bed and rigidly secured to the plate. Each bar is provided with an enlarged portion 32 along its outer edge. The distance between the flat sides of the several bars 31 is suitable to receive a row of type 33 between them. A groove 34 is provided in each edge of each type of suitable size and so positioned as to receive the enlarged edge 32 of the bars and rigidly retain each type in position with its foot firmly pressed against the plate 30. A resilient pad or block 35 is provided of suitable size to tightly fit between the bars at the end of each row of type to prevent lateral movement of the type and retain the line within proper boundaries. The plate 30 may be secured to the bed 2 in any desired manner. As shown the edges of the plate 30 are beveled outward toward the bed. As shown in Fig. 15 a suitable projection 2′ is provided at each edge of the bed, the face or inner edge of each projection being formed to fit the edge of the plate so that when the plate is forced against the projection it will be firmly pressed against the bed. The space between the projections is sufficient to permit the convenient removal of the plate and a suitably formed filler 30′ is provided to fill the space between the projection and the plate. Suitable set-screws 30^2 or other convenient means are provided to force the filler against the plate to firmly clamp the plate in position. The carrier 9 is preferably composed of steel, brass or other suitable material and is preferably formed with longitudinal channels 38 adapted to receive the type and engage the grooves 34 in the sides of the type and hold the type in position upon the carrier 9 so that the foot of each type will press against the outer face of the head thereby producing an absolutely rigid base for the entire form.

Any suitable means may be provided for presenting the paper to the form. As shown an impression cylinder 40 having a suitable impression surface 41 is rotatably mounted upon the frame 1 in bearings 42. The bearings 42 are each preferably positioned in a slot 43 or other convenient means for permitting their adjustment laterally and a screw 44 or similar adjusting means is provided adapted to engage each bearing 42 to adjust its position and rigidly maintain the same in any desired relation to the bed 2 so that when a sheet of paper is positioned upon the impression surface it will be brought into contact with the form with suitable pressure. The impression cylinder may be of the usual or any preferred form preferably having an opening 45 in one side with suitable rods 46 adjacent the edges of the impression surface for attaching the ends of the draw sheet 47 to hold the same in position upon the impression surface in substantially the usual manner. Suitable means are also provided for attaching the paper to the impression cylinder during the printing operation. In the form shown a shaft 48 is mounted in suitable bearings upon the end walls of the cylinder with any desired number of resilient clips or grippers 49 rigidly attached thereto adapted to cooperate with the inclined face 50 of the edge of the impression surface to hold a sheet of paper between them. In the form shown a collar 52 is rigidly secured to one end of the shaft 48 outside the cylinder. A rod 53 is pivotally attached to the collar 52 at one end, its opposite end is loosely engaged in a pivotally mounted bearing 54 and a spring 55 extends from the bearing 54 to a suitable collar or projection upon the rod. A pair of cam faces 56 and 57 are also provided on the collar 52 and a pair of rigid arms 58 and 59 are secured to some suitable portion of the frame each having a part extending into position to engage one of said cam faces and partially rotate said shaft. The several parts are so constructed and arranged that if the impression cylinder is rotated in the direction indicated in Fig. 21 when it arrives at the point where it is desired to engage the paper the arm 58 will engage the cam face 56 compressing the spring 55 and rotating the shaft 48 sufficiently to carry the pivotal connection between the rod 53 and collar 52 past the center line between the shaft 48 and bearing 54 after which the spring continues the movement of the shaft to cause the grippers to engage the paper and firmly hold the same until the cylinder arrives at the point where it is desired to release the paper. At this point the projection upon the arm 59 engages the cam face 57 compressing the spring 55 again and rotating the shaft 48 in the opposite direction, thus removing the grippers from their engagement of the paper.

Any suitable means may be provided to rotate the impression cylinder at a speed

corresponding to the movement of the form. As shown a gear 61 is rigidly attached to a central projection 63 upon one end of the bed and a suitable gear 62 is attached to the impression cylinder and arranged to mesh with the gear 61 so that a movement of the bed 2 will produce a corresponding movement of the impression cylinder 40.

Suitable means are also provided for automatically feeding the sheets of paper one by one to the impression cylinder. In the form shown a stationary bed or table 65 is mounted upon the frame 1 in position to support the paper above the impression cylinder. A receptacle 66 is provided upon the table 65 of suitable size to receive the paper and hold it in a neat even pile. The end of the receptacle adjacent the impression cylinder 40 projects beyond the table 65 and a movable slide 67 is provided adapted to extend transversely across the opening thus left in the bottom of the receptacle 66. The slide 67 may be mounted in any suitable manner to move transversely of the opening. As shown the slide is provided at each end with an arm 68 formed upon a plate 68′ positioned immediately below the table and provided with suitable guides or ribs 68^2 formed to fit in suitable ways or grooves 69 formed in a member 69′ rigidly secured to the frame 1. The plate 68′ is provided with a rack section 70 extending substantially parallel to the guides 68^2 and adapted to coöperate with a pinion 71 rigidly mounted upon the shaft 72 which is in turn rotatably mounted in suitable bearings in the frame 1 so that by rotating the shaft 72 the slide 67 may be moved to and from the edge of the table 65 below the opening in the receptacle 66. A roller 73 is mounted between the arms 68 in close proximity to the inner edge of the slide 67 and a pinion 74 is rigidly attached to the roller and arranged to mesh with a section of rack 75 rigidly mounted upon the side wall of the receptacle 66. The several parts are so proportioned and arranged that the upper surface of the roller travels in the opposite direction and substantially at the same speed as the plate 67, so that the surface of the roller in contact with the paper has no motion longitudinally of the paper, but as the roller rotates its surface merely moves vertically to and from the paper.

Any suitable means may be provided for temporarily attaching the single bottom sheet of paper in the receptacle 66 to the surface of the roller 73 so that as the plate 67 moves inward to close the opening in the bottom of the receptacle a single sheet will be separated from those in the receptacle and its margin carried into position to be engaged by the grippers 49 upon the impression cylinder 40. In the form shown the roller 73 is tubular (see Figs. 4 to 17 inclusive) with one end closed and a series of lateral openings 77 arranged substantially in line longitudinally of the roller, are provided in the wall of the roller. A suction pipe 78 is attached to the opposite end of the roller and connected to a cylinder 79 having a suitable piston positioned therein and arranged to operate as a pump. Each suction stroke of the piston exhausts the air from the roller thus tending to produce a current of air into the openings 77 which are temporarily covered by the paper. The lower sheet in the receptacle 66 is thereby firmly attached to the surface of the roller and firmly held in position while the roller is rotated into the position shown in Fig. 17. At this point the suction stroke of the piston is completed and it starts on its return movement thereby tending to expel any air which may have entered the roller through the openings 77 and releasing the paper from the roller. In the preferred form shown a resilient scraper 80 is attached to the plate 69′ and adapted to engage the edge of the sheet to free it from the roller. A guide 81 is also preferably mounted upon the slide 67 arranged to partially control the position of the sheet when released from the roller. The paper when thus released and detached from the roller springs out substantially as shown in Fig. 19 into position to be engaged by the grippers. When in this position the remainder of the paper in the receptacle 66 is supported at both ends thus preventing any disarrangement of the lower sheets as the sheet engaged by the grippers is drawn out from the pile in the receptacle by the movement of the impression cylinder.

Any suitable means may be provided for rotating the shaft 72. In the form shown a pinion 85 is rigidly mounted at the end of the shaft and an arm 86 is pivotally mounted upon the side of the receptacle as at 87, the free end of the arm having a segment formed thereon adapted to coöperate with the pinion 85 so that an oscillation of the arm 86 will rotate the pinion. The arm 86 may be oscillated in any suitable manner. As shown a rod 88 is pivotally attached to the arm 86 as at 89 with its opposite end attached to an arm 90 as at 91. A central portion of the rod 88 is curved or provided with a slot 93 adapted to loosely receive the projection 63 upon the bed 2. A roller stud 94 or other suitable means is also provided upon the rod 88 adapted to coöperate with a cam 95 upon the projection 63 so that as the bed 2 is rotated, the rod 88 will be moved longitudinally and actuate the arm 86 and connected mechanism to periodically deliver a single sheet of paper to the impression cylinder.

Any suitable means may be provided to ink the form upon the bed 2. As shown the side of the form adjacent the impression

cylinder is partially inclosed by a pair of stationary guards 100 and 101 attached to the frame 1 and each extending across the entire face of the form longitudinally of the bed, sufficient space is left however, between the adjacent ends of the guards to permit contact between the impression cylinder and the form. A bell-crank 102—103 is pivotally mounted at each end of the bed 2 upon the shaft 3 with the arms of each bell-crank extending radially of the bed. A pair of rollers or equivalent means 104—105 extend between the free ends of the bell-cranks each substantially parallel to the shaft 3. A bolt 106 is also provided to connect the free ends of the bell-cranks substantially parallel to the adjacent roller for accurately controlling the distance between the bell-cranks to insure the proper operation of the rollers.

Suitable means are also provided for maintaining the several parts accurately parallel with the shaft 3, that is, for preventing twisting or rotation of the bell-cranks independently of each other. In the form shown, a shaft 107 is mounted in suitable bearings in the end walls of the bed 2 substantially parallel to the shaft 3 and a suitable pinion 108 is rigidly mounted upon each end of the shaft 107 and each arranged to mesh with a gear 109 secured to the respective bell-cranks so that a rotary movement of either bell-crank will rotate the shaft 107 and thereby produce an exactly corresponding movement of the bell-crank at the opposite end of the bed. The rollers 104—105 are preferably provided with suitable means to prevent their free rotation and an inking ribbon 110 is mounted upon the rollers with a part extending between the rollers and supported by the guards 100—101. The portion of the ribbon extending between the guards is obviously normally out of contact with the type except when the impression cylinder forces the ribbon inward against the form.

Any suitable means may be provided for oscillating the bell-cranks 102—103 upon the shaft 3 to move the inking ribbon with the form during the printing operation and to return the parts to starting position before the next succeeding impression.

In the form shown a pinion 121 is rigidly secured to one of the bell-cranks concentric with the shaft 3 and a segment 122 is pivotally mounted upon a pin 123 rigidly secured to the frame 1 in position to mesh with the pinion 121. A suitable roller 124 is mounted upon the segment 122 in position to engage the groove and coöperate with a cam 125 rigidly attached to the end of the bed 2. Obviously as the bed rotates the segment will be oscillated by the cam which in turn will oscillate the bell-crank, the several parts being so constructed that the movement of the ribbon extending between the rolls will accurately correspond with the movement of the face of the type comprising the form.

Any suitable means may be provided for partially rotating the ribbon rollers periodically. In the form shown, a ratchet wheel 111 is provided at the end of the rollers 104 and 105 respectively and a pawl 112 is provided to engage either of said ratchet wheels to rotate the rollers in the desired direction. As shown, an arm 114 is pivotally mounted at one end as at 115 upon the frame 1 and provided with a slot 116 intermediate its ends. The double ended pawl 112 is pivotally mounted at the free end of the arm 114 and provided with two projecting fingers 117 at its back. The free ends of the fingers 117 are each attached to the arm 114 by a spring 118 or other suitable resilient means adapted to normally maintain the pawl 112 in suitable position so that when the arm 114 is in the position shown in Fig. 4 the lower end of the pawl 112 will engage the ratchet 111 attached to the roller 105 and rotate the ratchet one notch or tooth for each oscillation of the rollers and when the arm is raised slightly the upper end of the pawl will engage the ratchet attached to the roller 104 and rotate the ratchet one notch in the opposite direction for each oscillation of the rollers.

As shown, a crank 119 is rotatably mounted upon the frame 1 with a handle at the outside of the frame for turning the same and a wrist pin 120 positioned in the slot 116 so that by turning the crank 119 the pawl may be positioned to engage the ratchet wheel attached to the roller 104 or 105 as desired.

Where it is desired to provide an envelop for each letter, an envelop impression cylinder 130 may be provided, having an impression surface 131. The impression cylinder 130 is mounted upon a shaft 132 which is in turn rotatably mounted in movable bearings 133 arranged in a slot 134 or other convenient means for permitting the adjustment of the cylinder to or from the bed 2. A screw 135 or other convenient means is provided for accurately adjusting each bearing in the slot and for maintaining them in their adjusted position. The impression surface 131 is provided with a draw sheet 136 and a pair of resilient grippers 137 mounted upon a shaft 138 adapted to coöperate with one edge of the impression surface 131 to engage the envelop and hold it in position upon the cylinder.

In the form shown the shaft 138 extends longitudinally of the impression cylinder and is supported in suitable bearings in each end wall of the cylinder. A collar 138' is rigidly secured to one end of the shaft outside the end wall of the cylinder. One

end of a rod 138^2 is pivotally attached to the collar 138'. Its opposite end is loosely engaged in a movable bearing 138^3 and a spring 138^4 extends from the bearing to a suitable stop or enlargement upon the rod.

A pair of cam-faces 138^5 and 138^6 are also provided upon the collar 138' and a pair of rigid arms 132' and 132^2 are rigidly secured to some suitable portion of the frame to maintain the arms in position. A part 132^3 is provided upon the free end of each arm adapted to alternately engage the cam-faces 138^5 and 138^6 to partially rotate the shaft. The several parts are so constructed and arranged that with the impression cylinder rotating in the direction indicated in Fig. 22 of the drawings, when it arrives at the point where it is desired to engage the paper, the part 132^3 upon the arm 132' will engage the cam face 138^6 and rotate the shaft 138 sufficiently to carry the pivotal connection between the rod and collar past the center line between the shaft 138 and bearing 138^3 after which the spring will continue the movement of the shaft and hold the grippers in an engaging position until the cylinder reaches a point where it is desired to release the paper. At this point the part 132^3 upon the arm 132^2 engages the cam-face 138^5 rotating the shaft 138 in the opposite direction and retracting the grippers from the paper.

A gear 139 is rigidly secured to the shaft 132 and arranged to mesh with the gear 61 so that the impression surface 131 will travel at exactly the same speed as the face of the type upon the bed 2.

Any suitable means may be provided for automatically feeding the envelops into position to be engaged by the grippers 137. In the form shown a receptacle 140 is provided of suitable size to receive the envelops each lying in a horizontal position. A stop 141 extends across the side of the receptacle adjacent the impression cylinder 130 and a spring 142 is rigidly secured to the stop 141 and arranged to support the opposite edges of the envelops each of which is positioned in the receptacle with the loose flap or part to be sealed to the body of the envelop downward. A shaft 143 is mounted in a suitable position below the receptacle and a pair of hook shaped fingers 144 are rigidly secured to the shaft near each edge of the receptacle so that when the shaft is oscillated the extremity of the fingers 144 may be brought upward and toward the cylinder 130 after which if the shaft is turned in the opposite direction the fingers will enter between the flap of the envelop and the body portion drawing the forward edge of the envelop downward sufficiently to pass the lower edge of the wall of the receptacle 140, thence carrying the envelop out of the receptacle and delivering the same between a suitably formed roller 145 and a plurality of belts 146. A semi-cylindrical casing 147 extends from the lower edge of the receptacle 140 into position to direct each envelop between the feed roller and belts. The belts 146 extend between suitable pulleys 148 and 149 mounted upon the shafts 150 and 151 respectively. A bar 152 is rigidly mounted upon the frame 1 and extends transversely of the belts in close proximity to and beneath the upper portion.

A strip 153 is rigidly secured to the bar 152 preferably at the outer edge of each of the outer belts 146 and extends toward the impression cylinder 130, a second bar 154 is secured to the frame and extends substantially parallel to and immediately above the bar 152. A resilient finger 155 is rigidly attached to the bar 154 for each strip 153, the fingers 155 are formed to coöperate with the strips 153 and serve as a resilient stop to engage each envelop as it is delivered by the belts and hold the envelop in suitable position to be engaged by the grippers 137. Suitable means are provided for oscillating the shaft 143 and for rotating the shafts 150 and 151. In the form shown the arm 90 is provided with a segment 156 arranged to cooperate with a pinion 157 upon the end of the shaft 143 so that as the arm 90 is oscillated by the bar 88 the fingers 144 will be operated as hereinbefore described.

A rigid stud 160 is mounted upon the frame 1 and a pinion 161 of suitable size to mesh with the gear 139 is mounted upon the stud 160. A pulley 162 is also mounted upon the stud 160 and rigidly secured to the pinion 161. The pulley 162 is connected by a suitable belt 162' or equivalent means to a pulley 162^2 rigidly mounted upon the shaft 150, a pinion 163' is also rigidly secured to the shaft 150 and arranged to mesh with a pinion 164 rigidly connected to the roller 145. A second belt pulley 165 is also mounted upon the shaft 150 and a belt extends from the pulley 165 to a pulley 166 rigidly connected to a roller 167 near the lower end of the receptacle 140. A pair of arms 170 are also loosely mounted upon the shaft 171 of the rollers 145. The free ends of the arms 170 are adapted to coöperate with the impression surface of the cylinder 130 to remove the envelop from the cylinder, the arms 170 are preferably connected by a bar 172 having a part 173 extending past the end of the cylinder 130.

A roller 174 is mounted near the free end of the part 173 and adapted to coöperate with a cam 175 rigidly mounted near the end of the cylinder 130. The several parts are so proportioned and arranged that at each rotation of the cylinder 130 the arms 170 will be brought in close contact with the impression surface 131 and lift the envelop from the impression surface, the arms

are preferably raised sufficiently as each envelop leaves the cylinder to bring the envelop into contact with the roller 167 which thus mechanically drives the envelops along the arms toward the roller 145 and out through the opening 176 in the casing 147.

Any suitable means may be provided for inking that portion only of the form to be printed upon the envelop. In the form shown, a shaft 177 is rotatably mounted upon the frame 1 and provided with an arm $177'$ rigidly attached thereto with an inking roller 177^2 suitably mounted at its free end so positioned and arranged that the shaft 177 may be partially rotated to bring the roller 177^2 into contact with the type faces upon the carrier 9 temporarily in the form. The roller 177^2 is arranged when not in contact with the form to rest upon an ink spreading roll $178'$ of an ink font 178, the roller $178'$ is operated by a belt or other suitable means 178^2 from the shaft 151. An arm 177^3 is also rigidly attached to the shaft 177 with its free end engaging the free end of a lever 179 pivotally attached to the frame 1 as at $179'$ and having a lateral projection 179^2 with a roller 179^3 at its free end adapted to periodically coöperate with a cam face 179^4 upon the end of the bed 2. The several parts are so arranged that at each rotation of the bed the roller 177^2 is moved into contact with that portion of the form upon the carrier 9 and no more. A shield 179^5 is rigidly attached to the frame 1 to prevent the envelops attached to the cylinder from contacting with any part of the inking mechanism. Suitable means may also be provided for printing a signature upon each letter as it passes through the machine. As shown, a lever 195 is pivotally mounted upon the frame 1 as at 196 and provided with a suitable stamp 197 rotatably mounted upon one end beneath the impression cylinder 40. A roller 198 is provided at the opposite end of the lever adapted to periodically engage a cam face 199 upon the end of the bed 2 to move the stamp into contact with the sheet upon the impression cylinder, An ink pad 200 is rigidly secured to the frame in position to normally support the stamp 197, and a roller 201 is rigidly connected to the stamp so that when the stamp, which is so weighted that its face rests upon the ink pad 200 and is so directed away from the paper, approaches the paper the roller 201 will first engage the paper and the movement of the cylinder will thereby turn the stamp over having its face in contact with the paper at the desired point.

Any suitable means may be provided for driving our improved device. In the form shown a shaft 180 is mounted in a suitable bearing 181 upon the frame 1, a belt pulley 182 is rigidly secured to the outer end of the shaft 180, a pinion 183 is rigidly secured to the opposite end and arranged to mesh with a gear 184 loosely mounted upon a stud 185 rigidly secured to the frame 1. A pinion 186 is rigidly secured to the gear 184 and arranged to mesh with the gear 61. In operation the several carriers 9 are placed in the magazine 14, the desired form is secured in position upon the bed 2, paper is placed in the receptacle 66 and envelops in the receptacle 140. As soon as the mechanism is started the head 8 will remove a carrier from the magazine 14 and print the form with the matter upon that particular carrier upon a sheet of paper from the receptacle 66 after which the sheet will be directed by the guide 190 into the receptacle 191. The ribbon during the printing operation moving with the form and without disturbing its position upon the ribbon carrier, a further movement of the bed 2 brings the carrier 9 to the auxiliary inking mechanism which inks only the name of the party for whom the letter was intended and his address which is immediately impressed upon an envelop from the receptacle 140. During this operation the finger 144 has returned, engaged a second envelop and delivered it into the space between the rollers 145 and the belts 146 which immediately transfer it into position to be engaged by the grippers, in the meantime the printed envelop is removed from the impression cylinder and as the fingers 144 are retracted is shot down the arms 170 through the opening 176 into the receptacle 192. At the same time the carrier head 8 has operated to place the carrier 9 in the magazine 12 after which it moves forward and removes a second carrier from the magazine 14 and the printing operations above described are repeated, the movement of the bed and the several impression cylinders remaining substantially constant and uniform during the entire operation of the machine.

Having thus described our improvement it is obvious that various immaterial modifications may be made in our device without departing from the spirit of our invention, hence we do not wish to be understood as limiting ourselves to the exact form or construction shown.

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

1. In a device of the character described, the combination with a rotatable cylindrical bed, of a printing form fixedly mounted thereon, a radially movable head forming a part of said bed and having means for removably attaching thereto a printing form, means for controlling the position of said head, a platen coöperating with said head and cylindrical bed to print from said type forms, and means for removing an attached type form from said head and sub-

stituting another therefor while the bed is in motion and after each printing operation.

2. In a device of the character described, the combination with a rotatable cylindrical bed, of a printing form fixedly mounted thereon, a radially movable head forming a part of said bed and having means for removably attaching thereto a printing form, means for controlling the position of said head, means for rotating said bed with a substantially uniform motion, a platen adapted to coöperate with said bed to print from said type forms, and means for removing an attached form from said head and substituting another therefor while the bed is in motion and after each printing operation.

3. In a device of the character described, a rotatable cylindrical bed, a printing form fixedly mounted thereon containing a plurality of type, a radially movable head forming a part of said bed and having means for removably attaching thereto a printing form containing a plurality of type, means for controlling the position of said head, a platen adapted to coöperate with said bed to print from said forms, and means for removing an attached type form from said head and substituting another therefor while the bed is in motion and after each printing operation.

4. In a device of the character described, the combination with a rotatable cylindrical bed, of a printing form fixedly mounted thereon, a radially movable head forming a part of said bed and having means for removably attaching thereto a printing form, means for controlling the position of said head, a platen coöperating with said head and cylindrical bed to print from said type forms, and means for automatically removing an attached type form from said head and substituting another therefor while the bed is in motion and after each printing operation.

5. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same and means for rotating said bed, in combination with a type form mounted upon said bed comprising a plurality of separable sections each containing a plurality of type, one of which sections is attached to said head, a platen adapted to coöperate with said bed to print from said type form, and means for automatically removing said section from said head and substituting another section therefor while said head is raised and the bed is in motion.

6. In a device of the kind described, a rotatable cylindrical bed, printing type mounted thereon, a radially movable head forming a part of said bed, means for controlling the position of said head and periodically raising the same, and means for rotating said bed, in combination with a type form attached to said head, a platen adapted to coöperate with said bed to print from all the type upon the bed at each rotation of the bed, a plurality of type forms positioned adjacent said bed, and mechanism for removing the type from said head and substituting one of those positioned adjacent thereto while said head is raised and while said bed is in motion.

7. In a device of the kind described, a rotating bed and means for operating the same, a platen adapted to coöperate with said bed to print from all the type upon the bed at each rotation of the bed, in combination with a type form comprising a plurality of sections mounted upon said bed, a plurality of similar sections positioned adjacent the path of said bed, and mechanism for raising a section of said type above the normal printing surface, mechanism for removing the same from said raising means and substituting one of those positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

8. In a device of the kind described, a movable bed and means for operating the same, a platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, in combination with a type form mounted upon said bed, a plurality of forms positioned adjacent the path of said bed, mechanism for automatically raising a part of the type form above the normal printing surface, mechanism for removing the same from said raising means and substituting one of those positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

9. In a device of the kind described, a rotatable cylindrical bed, printing type mounted thereon, a radially movable head forming a part of said bed, means for controlling the position of said head and periodically raising the same, and means for rotating said bed with a substantially uniform motion, in combination with a type form attached upon said head, a platen adapted to coöperate with said bed to print from all the type upon the bed at each rotation of the bed, a plurality of type forms positioned adjacent said bed, and mechanism for removing a type form from the head and substituting one of those positioned adjacent thereto while said head is raised and said bed is in motion.

10. In a device of the kind described a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same, means for rotating said bed with a substantially uniform mo-

tion, in combination with a type form comprising a plurality of sections mounted upon said bed, one of which is mounted upon said head and rigidly attached thereto, a platen adapted to coöperate with said bed to print from all the type upon the bed at each rotation of the bed, and mechanism for removing the section of type form from said head and substituting one of those positioned adjacent thereto while said head is raised and said bed is in motion.

11. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same, means for rotating said bed and head with a substantially uniform motion, in combination with a type form comprising a plurality of sections mounted upon said bed, one of which is mounted upon said head and rigidly attached thereto, a platen adapted to coöperate with said bed to print from all the type upon the bed at each rotation of the bed, a plurality of similar type sections positioned adjacent said bed, and mechanism for automatically removing the section from the head and substituting one of those positioned adjacent thereto while said head is raised and said bed is in motion.

12. In a device of the kind described, a movable bed and means for operating the same with a substantially uniform motion, in combination with a type form comprising a plurality of sections each containing a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of movable type positioned adjacent said bed, a platen adapted to coöperate with said bed to print from all the type upon said bed at each operative movement of the bed, mechanism for automatically raising a section of said type form above the normal printing surface, mechanism for removing the same from said raising means and substituting one of the type forms positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

13. In a device of the kind described, a movable bed and means for operating the same, in combination with a type form comprising a plurality of sections each containing a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of movable type positioned adjacent the path of said bed, a platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, mechanism for automatically raising a section of said type form above the normal printing surface, and means for removing the same from said raising means and substituting one of the type forms positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

14. In a device of the kind described, a movable bed and means for operating the same, in combination with a type form comprising a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of type positioned adjacent the path of said bed, a platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, and means for automatically raising a part of the type form above the normal printing surface, mechanism for removing the same from said raising means and substituting one of those positioned adjacent thereto while the raising means is in raised position and the bed is in motion.

15. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same, means for rotating said bed with a substantially uniform motion, in combination with a type form comprising a plurality of sections each containing a plurality of movable type mounted upon said bed, one of which is mounted upon said head and rigidly attached thereto, a platen adapted to coöperate with said bed to print from said type form, a plurality of type forms each comprising a plurality of movable type positioned adjacent said bed, and mechanism for removing a section of said type from the head and substituting one of the type forms positioned adjacent thereto while said head is raised and said bed is in motion.

16. In a device of the kind described, a movable bed and means for operating the same with a substantially uniform motion, in combination with a type form comprising a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of movable type positioned adjacent the path of said bed, a platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, and mechanism for raising a section of said type above the normal printing surface, mechanism for removing the same from said raising means and substituting one of the type forms positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

17. In a device of the kind described, a movable bed and means for operating the same, in combination with a type form comprising a plurality of sections each containing a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of movable type positioned adjacent the path of said bed, a

platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, and mechanism for raising a section of said type above the normal printing surface, mechanism for removing the same from said raising means and substituting one of the type forms positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

18. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same, means for rotating said bed with a substantially uniform motion, in combination with a type form comprising a plurality of movable type mounted upon said head and rigidly attached thereto, a platen adapted to coöperate with said bed to print from said type form, and a plurality of type forms each comprising a plurality of type positioned adjacent said bed, and mechanism for automatically removing a type form from the head and substituting one of those positioned adjacent thereto while said head is raised and said bed is in motion.

19. In a device of the kind described, a movable bed and means for operating the same with a substantially uniform motion, in combination with a type form comprising a plurality of type mounted upon said bed, and a plurality of type forms each comprising a plurality of type positioned adjacent the path of said bed, a platen adapted to cooperate with said bed to print from all the type upon the bed at each operative movement of the bed, and mechanism for automatically raising a part of the type form above the normal printing surface, mechanism for removing the same from said raising means and substituting one of those positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

20. In a device of the kind described, a movable bed and means for operating the same with a substantially uniform motion, in combination with a type form comprising a plurality of movable type mounted upon said bed, a plurality of type forms each comprising a plurality of movable type positioned adjacent the path of said bed, a platen adapted to coöperate with said bed to print from all the type upon the bed at each operative movement of the bed, and mechanism for raising a part of the type form above the normal printing surface, mechanism for removing said type form and substituting one of those positioned adjacent thereto while said raising means is in raised position and said bed is in motion.

21. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and periodically raising the same, and means for rotating said bed, in combination with a type form comprising a plurality of movable type mounted upon said head and rigidly attached thereto, a platen adapted to coöperate with said head to print from said type form, a plurality of type forms each comprising a plurality of movable type positioned adjacent said bed, and mechanism for removing a type form from the head and substituting one of those positioned adjacent thereto while said head is raised and while said bed is in motion.

22. In a device of the kind described, a movable bed, means for operating the same and a type form mounted upon said bed in printing position, in combination with two magazines positioned adjacent the path of said bed, a plurality of type forms positioned in one of said magazines, and a transversely movable part upon said bed arranged to receive and support a section of said type form and adapted to pass through both of said magazines to remove said section from the bed, deposit the same in one of said magazines, remove one of those positioned in the other of said magazines and place the same in printing position upon said bed while said bed is in motion.

23. In a device of the kind described, a movable bed, means for operating the same and a type form mounted upon said bed in printing position, in combination with two magazines, each open at its lower end and positioned adjacent the path of said bed, a plurality of type forms positioned in one of said magazines, and a transversely movable part upon said bed arranged to receive and support a section of said type form and adapted to pass through both of said magazines to remove said section from the bed, deposit the same in one of said magazines, remove one of those positioned in the other of said magazines and place the same in printing position upon said bed while said bed is in motion.

24. In a device of the kind described, a movable bed, a transversely movable head forming a part thereof and means for operating said head, in combination with a type form mounted upon said head, a plurality of magazines positioned adjacent the path of said head, and a plurality of type forms in one of said magazines, and mechanism for moving said head to pass through both of said magazines to remove the type form from the head in one of said magazines and substituting one of the type forms from the other magazine upon said head while said bed is in motion.

25. In a device of the kind described, a movable bed, a transversely movable head forming a part thereof and means for op-

erating said bed, in combination with a type form mounted upon said head, a plurality of magazines, each open at its lower end, positioned adjacent the path of said bed, and a plurality of type forms in one of said magazines, mechanism for moving said head through both of said magazines to remove the type form from the head and placing the same in one of said magazines and substituting one of the type forms from the other of said magazines upon said head while said bed is in motion.

26. In a device of the kind described, a rotatable cylindrical bed and means for rotating the same, in combination with a type form mounted upon said bed, a magazine adjacent said bed and a plurality of type forms positioned in said magazine and mechanism for raising a part of the type form above the normal printing surface, removing the same from said raising means and substituting one of those positioned in said magazine while said bed is in motion.

27. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and means for rotating said bed with a substantially uniform motion, in combination with a type form mounted upon said head, a magazine adjacent said bed and a plurality of type forms positioned in said magazine, and mechanism for removing the type form from the head and substituting one of those positioned in said magazine while said head is in its outward position and said bed is in motion.

28. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and means for rotating said bed with a substantially uniform motion, in combination with a type form mounted upon said head, a magazine open at its lower end positioned adjacent said bed and a plurality of type forms positioned in said magazine, and mechanism for removing a part of the type form from the head and substituting one of those positioned in said magazine while said head is in its outward position and said bed is in motion.

29. In a device of the kind described, a rotatable cylindrical bed and means for rotating the same with a substantially uniform motion, in combination with a type form mounted upon said bed, a plurality of magazines, each open at its lower end, positioned adjacent said bed and a plurality of type forms in one of said magazines, and mechanism for removing a part of the type form from the bed, placing the same in a magazine and substituting one of the type forms positioned in the other of said magazines while said bed is in motion.

30. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and means for rotating said bed with a substantially uniform motion, in combination with a type form comprising a plurality of sections mounted upon said bed, one of which is mounted upon said head, a magazine positioned adjacent said bed and a plurality of type forms positioned in said magazine, and mechanism for removing the type form from the head and substituting one of those positioned in said magazine while said bed is in motion.

31. In a device of the kind described, a rotatable cylindrical bed, a radially movable head forming a part thereof, means for controlling the position of said head and means for rotating said bed with a substantially uniform motion, in combination with a type form comprising a plurality of sections mounted upon said bed, one of which is mounted upon said head, a plurality of magazines positioned adjacent said bed and a plurality of type forms in one of said magazines, and mechanism for removing a type form from the head, placing the same in a magazine and substituting one of the type forms from the other of said magazines upon said head while said bed is in motion.

32. In a device of the kind described, a rotatable cylindrical bed and means for rotating the same with a substantially uniform motion, in combination with a type form comprising a plurality of sections mounted upon said bed, a plurality of magazines, each open at its lower end, positioned adjacent said bed and a plurality of type forms in one of said magazines, and mechanism passing through said magazines at each rotation of said bed and removing a section of the form from the bed, placing the same in a magazine and substituting one of the type forms positioned in another of said magazines while the bed is in motion.

33. In a device of the kind described, a bed, a type form fixed upon said bed, a ribbon-inking and a roller-inking device cooperating with the same portion of said form, and independent impression mechanism associated with each inking device for printing from said form.

34. In a device of the kind described, a bed and a type form fixed upon said bed, a ribbon-inking and a roller-inking device successively coöperating with the same portion of said form, and independent impression mechanism associated with each inking device for printing from said form.

35. The combination with a movable bed, of a rotary platen, a ribbon interposed between said bed and platen having a reciprocating movement and moving in one direction synchronously with and in the same

direction as the platen during printing operation, and a stationary cover plate for said bed for preventing said ribbon from engaging with the bed when reciprocated in an opposite direction and having an opening therein through which the platen presses the ribbon into engagement with the surface of said bed.

36. The combination with a rotary bed, of a rotary platen, a ribbon interposed between the same having a reciprocating movement and moving in one direction synchronously with and in the same direction as the platen during the printing operation, a stationary cover plate for said bed for preventing said ribbon from engaging with the bed when reciprocated in an opposite direction and having an opening therein through which the platen presses the ribbon into engagement with the surface of said bed.

37. The combination with a rotary bed, of a rotary platen, a ribbon interposed between the same having a reciprocating movement and moving in one direction during the printing operation synchronously with and in the same direction as the platen, a stationary arcuate cover plate for said bed for preventing said ribbon from engaging with the bed when reciprocated in an opposite direction and having an opening therein through which the platen presses the ribbon into engagement with the surface of said bed.

38. The combination with a rotary bed, of a rotary platen, a ribbon interposed between the same having a reciprocating movement and moving in one direction during the printing operation synchronously with and in the same direction as the platen, and a stationary arcuate cover plate for said bed having a length equal to the length of movement of an exposed length of said ribbon for preventing said ribbon from engagement with the bed when reciprocated in an opposite direction and having an opening therein through which the platen presses the ribbon into engagement with the surface of said bed.

39. The combination with a movable bed, of a rotary platen, an independently mounted ribbon interposed between the same and having a bodily reciprocating movement, said ribbon moving during the printing operation in one direction synchronously and in the same direction as the platen, and a stationary cover plate for said bed for preventing said ribbon from engagement with the bed when reciprocated in an opposite direction and having an opening therein through which the platen presses the ribbon into engagement with the surface of said bed.

40. The combination with a movable bed, of a rotary platen, a ribbon interposed between the same having a reciprocating movement and moving during the printing operation in one direction synchronously with and in the same direction as the platen, and a ribbon guide and spacing member for preventing the ribbon from engaging and rubbing against the face of the bed during its movement in the opposite direction, said guide and spacing member having an opening permitting the platen to press the ribbon upon said bed during the printing operation.

41. In a device of the character described, the combination with a movable bed, of a rotary platen coöperating therewith, and an inking ribbon for said bed mounted independently of said bed and bodily movable in its entirety in the same direction as and synchronously with said bed during the printing operation.

42. In a device of the character described, the combination with a movable bed, of a rotary platen coöperating therewith, an inking ribbon for said bed mounted independently thereof and bodily movable in its entirety in the same direction as and synchronously with said bed during the printing operation, and means for varying the impression surface of said ribbon after each printing operation.

43. In a device of the character described, the combination with a movable bed, of a rotary platen and a ribbon for said bed mounted independently of said bed and bodily reciprocating in its entirety and movable during said reciprocation in the same direction as and synchronously with said bed during the printing operation.

44. In a device of the character described, the combination with a rotary bed, of a rotary platen coöperating therewith, a pair of ribbon rolls, and a ribbon extending between said rolls and interposed between said bed and platen, said rolls being mounted independently of the bed and bodily movable synchronously therewith during the printing operation.

45. The combination with a rotary bed, of a rotary platen, a pair of ribbon rolls, a ribbon extending between said rolls and interposed between said bed and platen, said rolls being mounted independently of the bed and bodily movable synchronously therewith during the printing operation, and means for winding said ribbon step by step from one roll to the other.

46. In a device of the kind described, a printing surface having a unidirectional printing movement, means movably supporting the same, and an inking ribbon at the face of said printing surface, in combination with mechanism for supporting and controlling the movements of said ribbon, said mechanism moving the entire ribbon uniformly in one direction synchronously with the printing surface during the print-

ing operation and in the opposite direction between printing operations.

47. In a device of the kind described, a printing surface, a rotatable cylindrical bed rotating in one direction only, movably supporting said printing surface, and an inking ribbon at the face of said printing surface, in combination with mechanism for supporting and controlling the movement of said ribbon, said mechanism moving the entire ribbon uniformly in one direction and synchronously with said printing surface during each printing operation, and in the opposite direction between printing operations.

48. In a device of the kind described, a printing surface, means movably supporting the same, an inking ribbon at the face of said printing surface, and a guard arranged to maintain said ribbon in position at the face of said surface but normally spaced therefrom, in combination with mechanism for supporting and controlling the movements of said ribbon, said mechanism moving the entire ribbon uniformly in one direction synchronously with said printing surface during each printing operation and in the opposite direction between the printing operations.

49. In a device of the kind described, a printing surface having a unidirectional printing movement, and an inking ribbon at the face of said surface, in combination with mechanism for supporting and controlling the movements of said ribbon, said mechanism automatically moving the entire ribbon uniformly in one direction synchronously with said printing surface during each printing operation and in the opposite direction between printing operations.

50. In a device of the kind described, a printing surface comprising a plurality of movable type arranged in printing position, a rotatable cylindrical bed movably supporting the same, an inking ribbon at the face of said printing surface, and a guard arranged to maintain said ribbon in position at the face of said type but normally spaced therefrom, in combination with mechanism for supporting and controlling the movements of said ribbon, said mechanism moving the entire ribbon uniformly in one direction synchronously with said printing surface during each printing operation and in the opposite direction between printing operations.

51. In a device of the kind described, a printing surface, a rotatable cylindrical bed movably supporting the same, an inking ribbon at the face of said printing surface, and a guard arranged to maintain said ribbon in position at the face of said printing surface but normally spaced therefrom, in combination with mechanism for supporting and controlling the movements of said ribbon, said mechanism automatically moving the entire ribbon uniformly in one direction synchronously with said printing surface during each printing operation and in the opposite direction between the printing operations.

52. In a device of the kind described, a movable printing surface, means for supporting the same and moving said surface during each impression, an inking ribbon at the face of said printing surface, and means for moving the entire inking ribbon synchronously in the same direction with said printing surface during each impression, in combination with a guard arranged to maintain said ribbon in position at the face of said printing surface but normally spaced therefrom.

53. In a device of the kind described, a movable printing surface, a rotatable cylindrical bed supporting the same and moving said surface during each impression, an inking ribbon at the face of said printing surface, and means for moving the entire inking ribbon in the same direction and synchronously with said printing surface during each impression, in combination with a guard arranged to maintain said ribbon in position at the face of said type but normally spaced therefrom.

54. In a device of the kind described, a bed having a unidirectional printing movement, type forms mounted upon said bed, and means for printing therefrom, in combination with means for inking and printing from a part only of said forms without changing the position of said forms upon the bed.

55. In a device of the kind described, a bed having a unidirectional printing movement, type forms mounted upon said bed, and means for printing therefrom, in combination with means for automatically inking and printing from the complete form and part only of said forms alternately without changing the position of the forms upon the bed.

56. In a duplicating machine, the combination of a cylindrical rotary master printing member, means for imparting the rotary movement to the said member for printing purposes; a feed magazine; a group of auxiliary printing members located therein; means for normally retaining the auxiliary members in the magazine and an operative connection between the said retaining means and the master member, whereby the auxiliary members are automatically and successively released and brought into coöperative relation with the master member during the operation of the latter.

57. In a duplicating machine, the combination of a master printing member mounted to rotate, a series of auxiliary printing members, the master member having a recess of suitable area to receive the auxiliary

members individually, means for imparting rotary movement to the master member, means for automatically and successively bringing the auxiliary members into the recess in the master member for printing purposes during the rotary movement of the master member, a magazine for receiving the auxiliary members, and means for retaining the auxiliary members in position upon the master member until they reach the second named magazine.

58. In a machine of the class described, a printing drum mounted to rotate and adapted to carry separate and distinct printing members, a number of said members held originally in a supply magazine, retaining and releasing means adjacent to the said magazine, a platen adapted to coöperate with said printing drum, the drum and the releasing means having a coöperative relationship, whereby as the drum is rotated the printing members are released one at a time and moved on to the periphery of said drum in printing position thereon.

In testimony whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

CESARE BARBIERI.
JOHN S. THOMPSON.

Witnesses:
BURTON U. HILLS,
BLANCHE CHALMERS.