

No. 747,694.

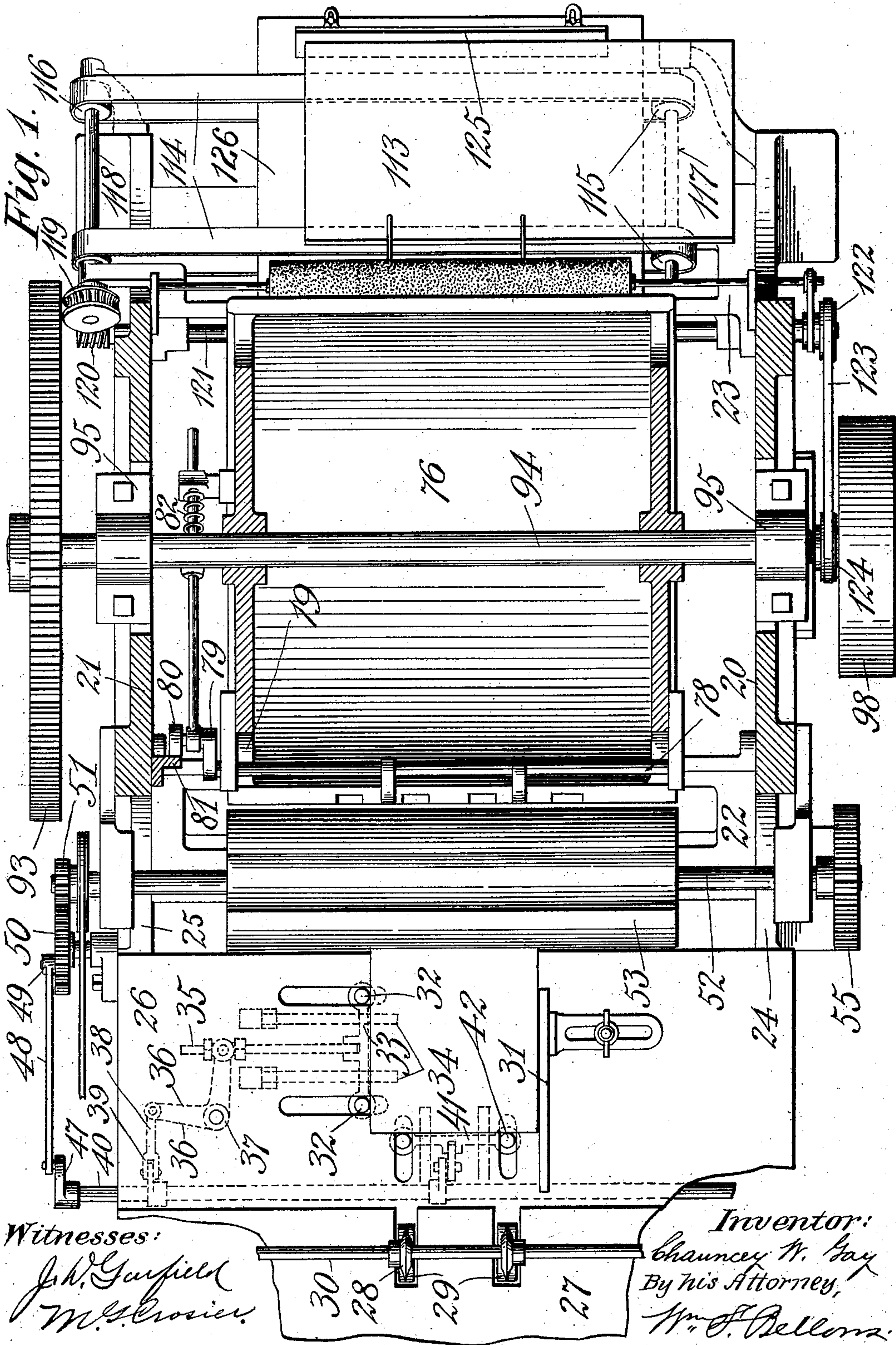
PATENTED DEC. 22, 1903.

C. W. GAY.
PRINTING MACHINE.

NO MODEL.

APPLICATION FILED MAR. 20, 1903.

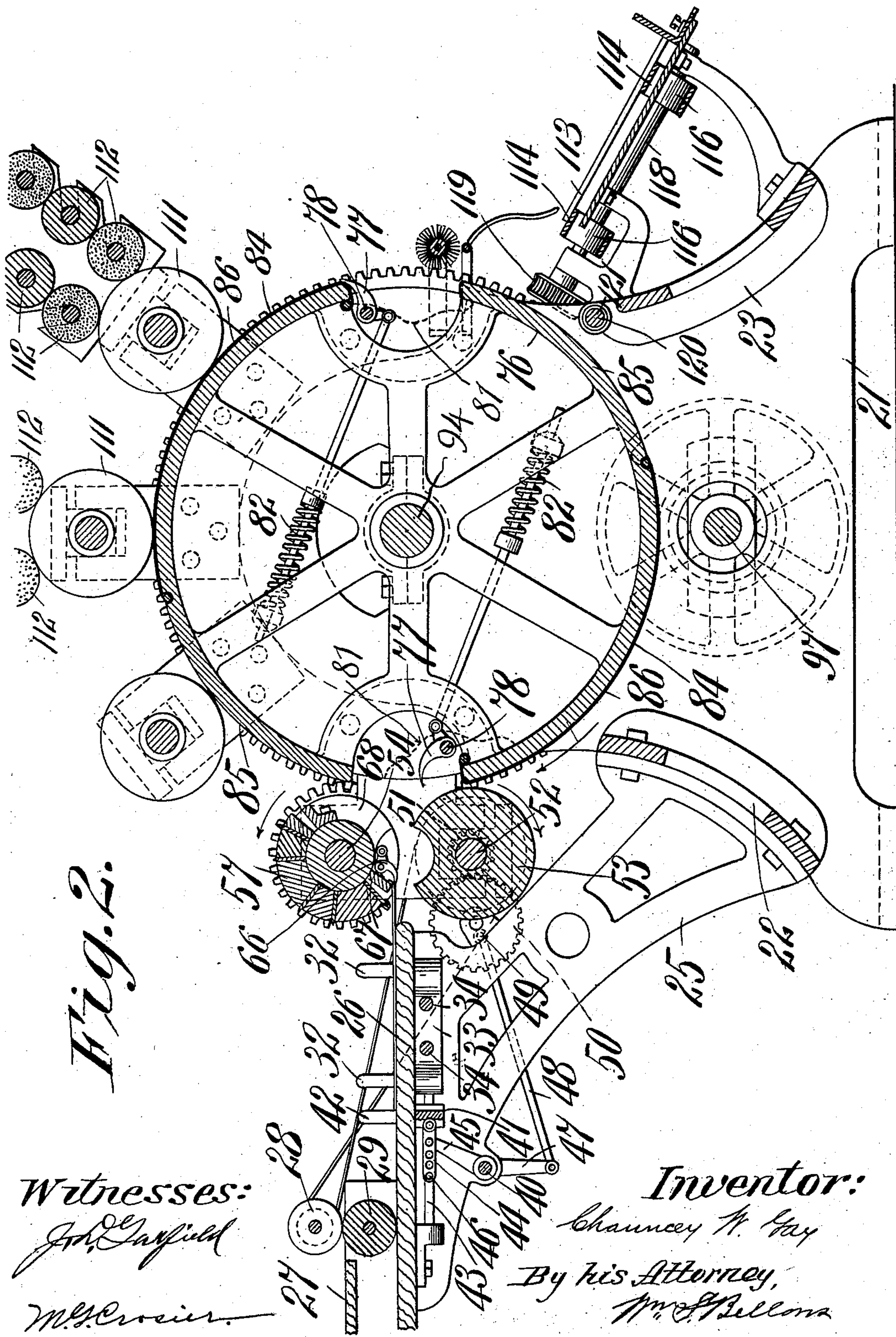
3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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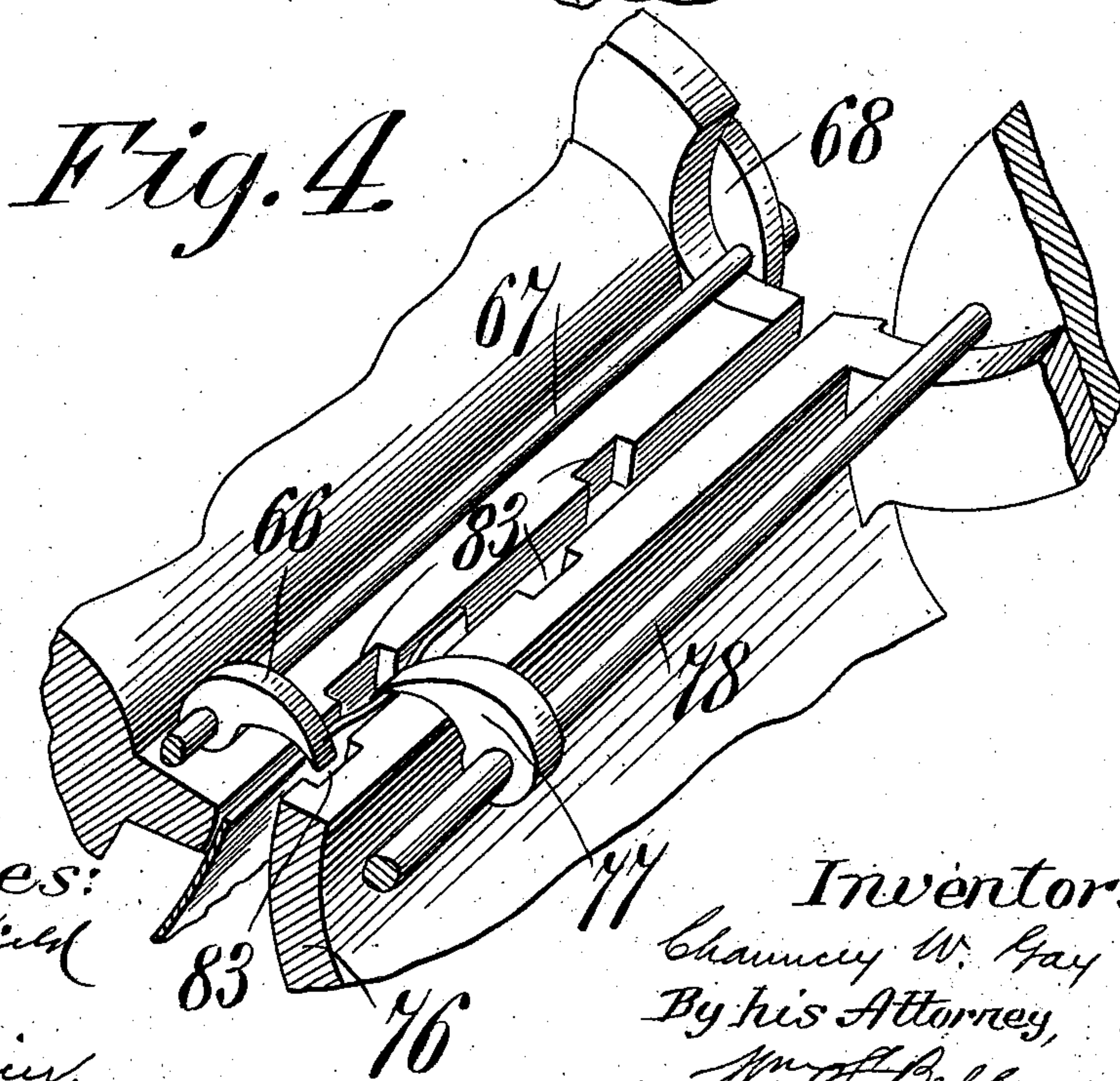
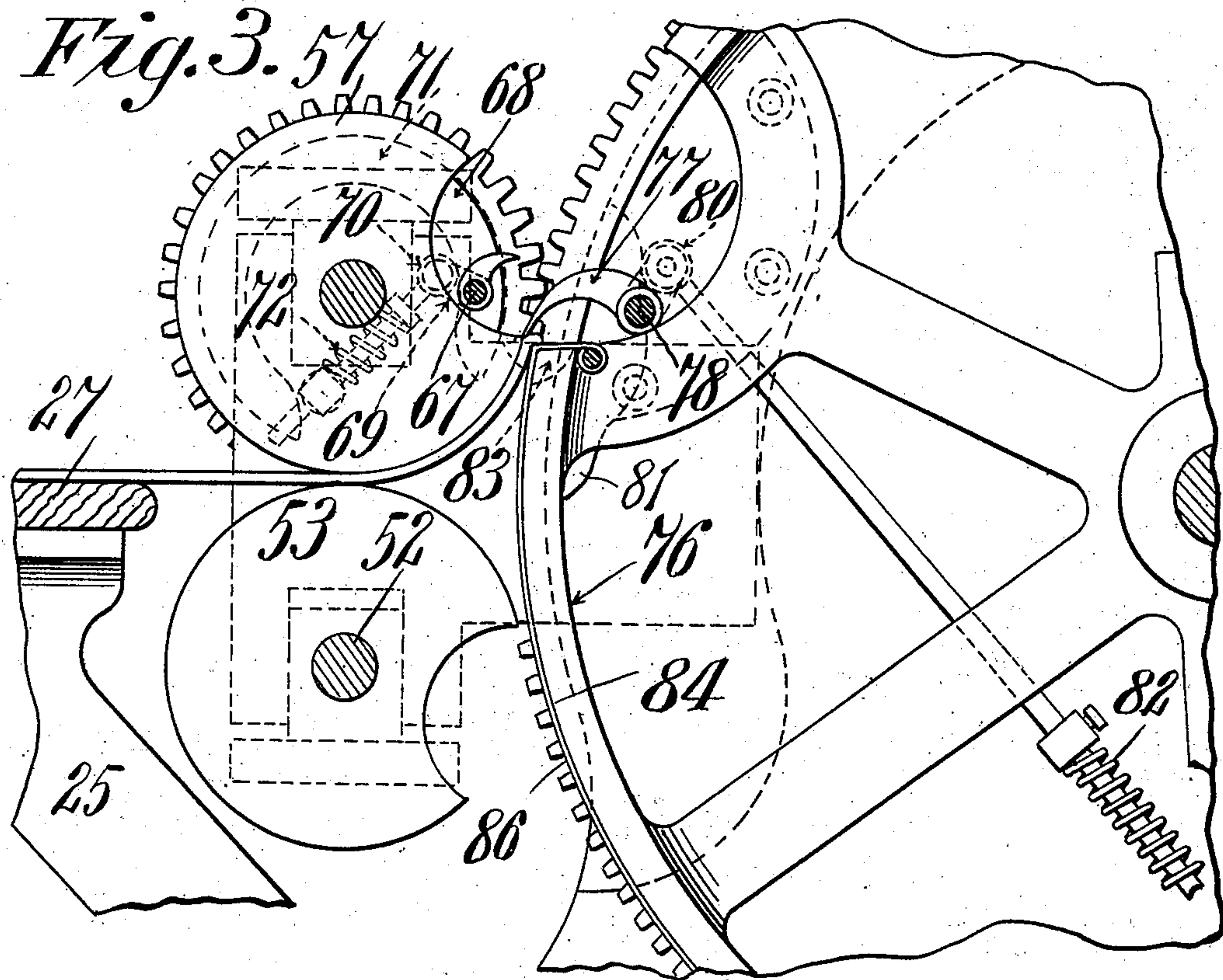
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3 SHEETS—SHEET 3.



Witnesses:
John G. Fairfield
M. G. Crozier

Inventor:
Chauncey W. Gay
By his Attorney,
W. O. Bellows

UNITED STATES PATENT OFFICE.

CHAUNCEY W. GAY, OF WEST SPRINGFIELD, MASSACHUSETTS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 747,694, dated December 22, 1903.

Application filed March 20, 1903. Serial No. 148,715. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY W. GAY, a citizen of the United States of America, and a resident of West Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making and Printing Blanks for Cartons or other Purposes, of which the following is a full, clear, and exact description.

This invention relates to improvements in printing-machines, and more especially to that class thereof which comprise a comparatively large cylinder which serves as a carrier and platen upon which the printing is performed, one or more printing-cylinders combined with the carrier-cylinder, devices for feeding the blanks to the carrier-cylinder, and means on the latter for holding the blanks thereon in readiness for and during the printing operation.

An object of the invention is to provide a new arrangement or organization of the machine, so that the printing cylinder or roller, or usually several thereof, coacting with the carrier and impression-faced cylinder may be inked more than once for each printing operation of each printing-cylinder in conjunction with the relatively adjacent peripheral impression-surfaces of the carrier-cylinder, whereby printing-inks of thinner character and susceptible of better and more uniform distribution may be employed and used by superimposition on the printing-cylinder for better printing results than would be the case were the printing-cylinders each subjected to but one ink-supplying rolling contact around its printing-face by the ink-supplying roll or rolls for its each and every printing operation.

A further object of the invention is to so organize the machine that it is possible to feed the blanks from a horizontal or otherwise suitably-disposed feed-table having its surface and the feeding-plane non-tangential to the carrier and impression-faced cylinder, but, on the other hand, in a plane which is approximately coincident with the axis of rotation of the cylinder impression-faced carrier or platen, the blanks edgewise approaching the body of the platen-cylinder about perpendicularly thereto, permitting a successful op-

eration of the machine without necessarily using "flies" or carrier-tapes in conjunction with the carrier-cylinder; and a further object of the invention is to organize and arrange the parts of the machine in a manner to acquire in a most simple and inexpensive manner efficient printing in one or as many colors as desired and in perfect registry at a maximum speed.

The invention consists in combinations or arrangements of parts and the construction of certain of the parts, all substantially as hereinafter fully described, and set forth in the claims.

In the accompanying drawings, in which a machine is illustrated embodying the present improvements, Figure 1 is substantially a plan view, the carrier or platen cylinder being represented in horizontal section on the plane of its axis, some parts, understood as located above such plane, being absent. Fig. 2 is a central vertical longitudinal section of the machine. Fig. 3 is a side elevation, on a larger scale, of a portion of the carrier-cylinder and coöperative rolls and devices. Fig. 4 is a perspective representation of some of the parts especially included in the preceding figure.

In the drawings, 20 21 are suitable side frames in which the several component elements of the machine are supported, and which are properly distanced by ties 22 23.

Secured to the frames 20 21 are brackets 24 25, which support a table 26, on which the blanks to be operated upon are properly positioned. The blanks may be fed one at a time onto the table 26 from a shelf 27 and between feed-rolls 28 29 to drop onto the table 26, where each blank will be positioned for proper presentation to the printing mechanism. The means for positioning the blank comprise, preferably, a guide-plate 31, which may be stationary and at the same time adjustable laterally of the table 26, and coöperative with the guide-plate 31 are placing or jogging pins 32, mounted for movement toward and away from the plate 31—as, for instance, by a yoke 33—to which reciprocal movement may be imparted on guide-rods 34 by a link 35, pivotally secured on the yoke 33, and having its other end adjustably secured to one arm of an angle-lever 36, which

is pivoted at 37, and the other arm of which is connected through a link 38 with a lever 39, secured upon a rock-shaft 40. The blank is in this manner properly positioned later-
 5 ally of the table, and means are provided for advancing the blank toward the further feeding devices for the required distance and at the proper time, these means comprising, in the form thereof shown, a yoke 41, having
 10 pins 42, and slidably supported on guide-rods 43, on which said yoke may be reciprocated by a link 44, connected with an arm 45 at any one of a series of adjusting-holes 46, so that the advanced position of the leading
 15 blank end may be regulated as desired. The arm 45 is shown as secured on the rock-shaft 40, above mentioned, and which shaft may be oscillated by an arm 47, connected by a link 48 with a crank-pin 49, secured on a spur-
 20 gear 50, journaled on the bracket 25 and rotated by a pinion 51 on a shaft 52. Mounted on the shaft 52 is a roller 53, serving as a support for the blank during its feeding movement toward the carrier, and with which
 25 coöperates a roll or drum 57, mounted on a shaft 54, journaled in the frame, both such rollers being rotated simultaneously and for uniform peripheral speed in the direction of the arrows by suitable gearing. The blank
 30 is led toward and maintained in proper position relatively to the carrier-cylinder 76, which serves as a platen-support therefor, until it has been printed in one or several colors, as may be required. Means are pro-
 35 vided for seizing and holding the leading end of the blank on the carrier 76, these means comprising gripper-fingers 77, mounted on a shaft 78, having at one end arm 79, the roller
 40 80 of which is adapted to engage a preferably stationary cam 81, whereby the fingers 77 are opened and against the action of a spring 82. The present carrier-cylinder 76 is of such size as to have a capacity of two
 45 blanks for each rotation, so that the blank-gripping fingers are provided in duplicate.

In connection with the construction and action of the roll 57 and carrier 76 it is to be noted that these parts have the longitudinally-
 50 extending crescent-shaped depressions or comparatively large grooves or recesses 19 to give space for occupancy of the grippers and the portion of the blank manipulated thereby within the contours of the peripheries of these parts, and the lower roll 53 is likewise formed
 55 with its wall along one side reëntrant to permit its proper coöperation with the gripper-carrying drum. In order that the grippers, which are located within the recesses in the respective cylindrical parts adjacent the junction
 60 of the wall of the recess with the adjacent peripheral portion, may have their proper opening and closing movements through courses which are outside of the peripheral contour of the carrier-cylinder 76 and the roll
 65 57, such parts are constituted with respective series of niches 83, arranged along the lengths thereof at the junctions of the walls of the

recesses and the peripheries, the niches in the carrier-cylinder 76 being relatively opposite the gripper-fingers of the roll 57 while the
 70 niches in the roll 57 are relatively opposite the gripper-fingers of the carrier-cylinder, such niches of course being offset as the one set thereof is related to the other set.

The grippers 66, provided as equipments to
 75 the roll 57, are mounted upon the small rock-shaft 67, which is journaled in end plates 68, affixed on the ends of said roll, and said shaft is provided with an arm 69, having a roller
 80 70, adapted for engagement with a cam 71, (see Fig. 3,) which is understood as stationary and sustained on a suitable supporting part of the machine adjacent the end of the said roll and serving to open the grippers, while a
 85 spring 72 is operable to close the same.

The particular method of transferring the blank from the roll 57 to the carrier is clearly indicated in Figs. 3 and 4, in which the roller
 80 80 is substantially free of the opening-cam 81 to permit the spring 82 to impinge the finger
 90 77 on the leading end of the blank and preparatory to its release from the grippers 66 of the scoring-drum, whereupon the grippers 66 are operated by the roller 70, engaging the
 95 stationary cam 71, to release the blank, as shown in Fig. 3. After the blank has been brought to and moved partially through the pair of rolls 57 53 it will be carried along by the rotating carrier-cylinder 76, which is
 100 shown as formed with alternate impression-surfaces 84 and recessed or relieved portions 85, the former of which are covered with tympan 86, as common, held thereon in any
 105 suitable manner and constitute the blank-supporting and "impression" faces of the carrier, while the relieved portions will clear the several printing-cylinders, to which the blank is successively subjected. The blank released by the grippers of the roll 57 and
 110 taken by the grippers of the carrier-cylinder 76 and movable around on and with the upper hemicylindrical portion of the said carrier-cylinder is carried thereby, subject to the printing action of one or more ink-print-
 115 ing rolls 111, arranged axially parallel with and in peripheral proximity to the prominent or impression-surface portions of the carrier, each said printing-roller having combined
 120 therewith ink-supplying and ink-distributing rollers of a common and approved construction and arrangement. The organization is such that the diameter of each of the print-
 125 ing-rollers 111 is fractional of the diameter of the carrier-cylinder, and the peripheral length of the impression-face 84 is equal to the complete circumference of the printing-face portion of the printing-cylinder, the vacancy or
 130 recess between the impression-surfaces 84 being likewise equal to the circumferential extent of the printing-roller, so that for each printing operation—that is, during the time of printing against the impression-surface or platen-section 84 and during the time of transit under the printing-roll of the properly

long-vacant or non-prominent portion of the cylinder 76—the printing-roll will have two rotations imparted thereto, and being in constant rolling contact with the inking roll or rolls 112 will have superimposed layers of ink supplied thereupon, rendering possible the employment of a fine ink and one which is of more than usually thin consistency for a printing result which would not be acquired by the employment of a thicker or heavier ink or an ink supplied upon the printing-roll but once for each printing operation.

As shown, the carrier-cylinder 76 is constructed four times the diameter of each of the printing-rolls 111, is provided with diametrically opposite sets of grippers, each set thereof being at the initial end of diametrically opposite prominent impression-surfaces 84, each of which has a peripheral extent equal to one-quarter of the circumference of the large cylinder, and both being separated by a vacancy or relieved or recessed portion of equal length to that of the impression-surface portion, and all of the printing-rolls have their locations above and contiguous to the upper half of the carrier-cylinder.

A peculiarity noticeable in the action of this machine is that the blanks are fed in a plane approximately coincident with the axis of the carrier-cylinder 76, the arrangement of the paired rolls 57 and 53 relatively to the larger cylinder enabling the blanks to approach toward the carrier-cylinder perpendicularly or substantially squarely at the middle of its body, and the management of the blank, while being subjected to the printing or printings thereon, is during the time or within the time that the impression-face portion of the carrier-cylinder is moving grasping the leading end of the blank from the horizontal plane of feed upwardly and around to the opposite place for the discharge of the blank, so that the blank, held merely at its leading end, will lie flat and evenly upon and throughout the whole or any desired portion of the impression-surface, accordingly as the blank may be larger or smaller, and no other confining or retaining means than the said grippers at the leading end are required, the blank remaining by its gravity smoothly in place upon the impression-surface of the carrier, and of course its successive printings which may be performed while the blank is making a half of a cycle will be in perfect register; and from the foregoing it will be manifest that this machine may be successfully run, with greater rapidity doing multicolor-printing work without the employment of any "flies" carrying or retaining tapes or retaining springs in conjunction with the carrier-cylinder, and the entire surface of the blank may be printed upon with the exception of the slight leading end places within the temporary retaining grasp of the grippers 77.

It will of course be apparent that without departing from this invention a very much

larger carrier-cylinder may be employed, the multiple of its diameter being greater than a four-fold one corresponding to the printing-roller or multiplied printing-rollers, so that a carrier might comprise three, four, or more sets of alternating impression-surfaces and relatively intermediate vacancies with respectively provided grippers and gripper-actuating devices, the printing-rollers, however, having their locations only at and in operative proximity to an upper portion of the carrier-cylinder.

After each blank is printed as described the carrier will convey it toward the deliverable seasonably and near which point the gripper 77 will be opened to release the blank, which may then drop or slide onto a receiver therefor, a receiver here being represented as constituted by a board 113, removably supported on one or more belts 114, constituting a continuously-advancing apron and support pulleys 115 and 116, on shafts 117 and 118, respectively, which are suitably journaled on the side frames of the machine. The shaft 118 is represented as driven by a worm-gear 119, mounted thereon and engaged by a worm 120, secured to a shaft 121, also journaled in the side frames and obtaining rotary movement through a pulley 122, mounted upon the other end thereof, and operative by a belt 123 from the pulley 124, which is mounted upon the main driving-shaft 97, so that in this manner the movement of the belts 114 will be comparatively slow but uniform during the rotation of the carrier. In consequence of this movement the blanks will as they successively leave the carrier overlap each other on the receiving-board 113, and will, furthermore, be positioned thereon with their lower edges against a gage-board 125, which is preferably adjustably secured to a frame 126, so as to adapt the same for different lengths of blanks. After the board 113 has received blanks up to its capacity it may be removed from the belts 114 without in any way disturbing the blanks thereon, therefore avoiding all liability of blurring the freshly-printed surfaces thereon, while at the same time they may then be carried away and placed aside to dry. It will of course be understood that when the full board 113 is removed from the belts 114 another empty board may be substituted therefor to receive further printed blanks.

While in this machine the grippers on the carrier-cylinder 76 and on the roll 57 are included in novel arrangements which comprise such carrier and roll and other coöperative parts; it is not to be understood that I claim any novelty in the combination of cylinders or rolls with grippers and with gripper-actuating means, for I am aware that such are old, and the forms of the grippers and the actuating means therefor which I employ are or may be of substantially the same character as hereinafter known and used.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In a printing-machine of the character described, the combination with a carrier-cylinder, having a blank-gripper, coöperative with a portion of the cylinder at its periphery, and means for periodically operating the gripper, said cylinder having an impression-receiving peripheral portion and a recessed portion, of a type-carrying cylinder of less diameter than that of the carrier-cylinder, and having its circumferential extent substantially corresponding to the length of the peripheral impression-receiving portion of the carrier-cylinder, ink-supplying rolls, co-operating with the printing-cylinders, a feed-table for blanks having its upper surface in a plane substantially radial to the carrier-cylinder, gaging and guiding devices for the blanks, coöperating with the feed-table, and a periodically-operating device for moving the blanks on the table successively toward the gripper-carrying peripheral portion of the carrier-cylinder.

2. In a printing-machine of the character described, the combination with a carrier-cylinder having recesses equally distanced around and within the peripheral portion of such cylinder, having grippers carried by such cylinder, and coöperating with portions of the cylinder at the junctions of the peripheral portion and the walls of the recesses, and said carrier-cylinder having between each pair of recesses, its unrecessed peripheral portions constituting an impression-surface, of a printing-roll smaller than the carrier-cylinder and having its circumferential extent equal to the length of each of said carrier-cylinder impression-surfaces, and an ink-supplying roller in rolling contact against the printing-cylinder, a feed-table and means for moving blanks thereon approximately radial to the carrier-cylinder toward the latter, whereby each blank will be carried around on an impression-surface of the carrier-cylinder and printed thereagainst, and whereby the printing-cylinder may receive ink during its rotation peripherally against said impression-surface, and receive a second inking during its rotation relatively to the recessed portion of the carrier-cylinder.

3. In a printing-machine, the combination with a large carrier-cylinder and a smaller printing-cylinder, in peripheral proximity thereto, said carrier-cylinder being recessed inwardly from its periphery at regular intervals, and having a succession of peripheral impression-surfaces and relatively intermediate vacancies, which impression-surfaces and which vacancies intermediate thereof are respectively of lengths corresponding to the circumferential extent of the printing-cylinder, of an inking-roller in rolling contact on the printing-cylinder, grippers carried by the carrier-cylinder and operable against and away from end portions of the

impression-surfaces, and means for feeding blanks periodically toward and to be successively taken by the gripper-provided carrier-cylinder, for the purposes set forth.

4. In a printing-machine of the character described, the combination with the carrier-cylinder having a plurality of recesses opening to its periphery, and having grippers operable within said recesses, and means for periodically opening and closing them, of a pair of rolls adjacent the carrier-cylinder, arranged with the contacting peripheral portions thereof in a plane radial to the carrier-cylinder, one of said rolls having a recess therein opening to the periphery thereof, having grippers therein, and means for periodically opening and closing such latter-named grippers, and one or more printing-cylinders peripherally coacting with the said carrier-cylinder.

5. In a printing-machine of the character described, the combination with the carrier-cylinder having a plurality of recesses opening to its periphery, and having a succession of impression-surfaces and relatively intermediate vacant spaces of corresponding extent and having grippers operable within said recesses, and means for periodically opening and closing the grippers, of a pair of rolls adjacent the carrier-cylinder arranged with the contacting peripheral portions thereof in the horizontal plane of, and parallel with, the axis of the carrier-cylinder, one of said rolls having a recess therein opening to the periphery thereof, having grippers therein, and means for periodically opening and closing such latter-named grippers, and one or more printing-rolls, each of a circumferential extent, the same as the length of each said impression-surfaces, and each said vacant spaces at the circumference of the carrier-cylinder, peripherally adjacent the carrier-cylinder, and coöperating therewith, and an ink-supplying roll in peripheral contact with each printing-roll, for the purposes set forth.

6. In a printing-machine of the character described, in combination, the pair of rolls and 53, one thereof provided with a sidewise-opening recess, the carrier-cylinder of larger diameter than said roll having a plurality of sidewise-opening recesses, and said carrier-cylinder and recessed roll having within their peripheral surfaces adjoining said recesses the apertures 83 arranged at different points along the lengths of the respective cylinder and roll, those on the cylinder having positions offset relatively to those of the roll, the rock-shafts 67 and 78 located and ranging along in said recesses and having grippers 66 and 77 thereon, those of the cylinder being arranged to be accommodated in the recesses in the roll and vice versa, and means for periodically opening and closing said grippers.

7. In a printing-machine of the character described, the combination with an axially horizontal carrier-cylinder, impression-faces at opposite portions thereof, and grippers

pertaining to each impression-faced portion of the cylinder, of a pair of rolls arranged parallel with the axis of the carrier-cylinder and adjacent thereto, and having the contiguous peripheral portions thereof located in a plane radial to the carrier-cylinder, the upper one of said rolls having grippers, means for positioning and guiding blanks between said rolls, and one or more printing-cylinders having a diameter fractionally that of the carrier-cylinder, and having its location in cooperative proximity to the upper half of the carrier-cylinder, for the purpose set forth.

8. In a printing-machine, the combination with a carrier-cylinder having oppositely-arranged peripheral impression-sections, and respectively provided grippers at the leading end of each impression-section, and means for seasonably opening and closing said grippers, of one or more printing-rolls arranged adjacent the upper portion only of the carrier-cylinder, and blank-feeding means, located at the side of the carrier-cylinder, and operative to periodically and successively advance blanks in approximately a plane radial to the carrier-cylinder, to be received by one of the said sets of grippers, and thereby carried around and supported upon the upper portion of said carrier and subjected without liability to displacement to the action of said one or more printing-rolls.

9. In a printing-machine of the character described, the combination with a comparatively large rotary carrier-cylinder, having a plurality of peripheral impression-faces, grippers arranged at the leading end of each impression-face, and means for automatically and periodically opening and closing the respective grippers, of one or more printing-rollers having diameters fractional of that of the carrier-cylinder, and located in printing proximity to the upper half of such cylinder, a feed-table located at the front side of the carrier-cylinder, and having its upper surface in a plane substantially radial to the carrier-cylinder, a guide and gage on said table arranged with its length along the line of feed, an oppositely-located horizontally and transversely reciprocating blank-evening device, a rearwardly-located blank-pushing device, and means for imparting a reciprocatory movement thereto in the line of feed toward the side of the carrier-cylinder.

10. In a printing-machine of the character described, the combination with a compara-

tively large rotary carrier-cylinder, having a plurality of peripheral impression-faces, grippers arranged at the leading end of each impression-face and means for automatically and periodically opening and closing the respective grippers, of one or more printing-rollers having diameters fractional of that of the carrier-cylinder, and located in printing proximity to the upper half of the carrier-cylinder, a feed-table located at the front side of the carrier-cylinder, upper and lower rolls next to the side of the cylinder, axially parallel therewith and in advance of the feed-table, a guide and gage on said table arranged with its length along the line of feed, an oppositely-located horizontally and transversely reciprocating blank-evening device, a rearwardly-located blank-advancing device, and respective means for imparting the transverse and longitudinal reciprocatory movements to the evening device and the blank-advancing device.

11. In a printing-machine of the character described, the combination with a comparatively large carrier-cylinder, having a plurality of impression-faces, and intermediate vacant portions of extents corresponding to the lengths of the impression-faces, grippers arranged at the leading end of each impression-face and means for automatically and periodically opening and closing the respective grippers, of one or more printing-rollers having circumferences equal to the length of each said impression-faces, and all located in printing proximity to the upper portion of the carrier-cylinder, a feed-table located at the front side of the carrier-cylinder, having its upper surface in a plane substantially radial to said cylinder, a guide and gage on said table arranged with its length along the line of feed and oppositely-located horizontally and transversely reciprocating blank-evening device, a rearwardly-located blank-advancing device, means for imparting the reciprocatory movements to the blank-evening and blank-advancing devices, and a receiver for blanks at the opposite side of the carrier-cylinder from the location of the feed-table.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

CHAUNCEY W. GAY.

Witnesses:

WM. S. BELLOWS,
A. V. LEAHY.