

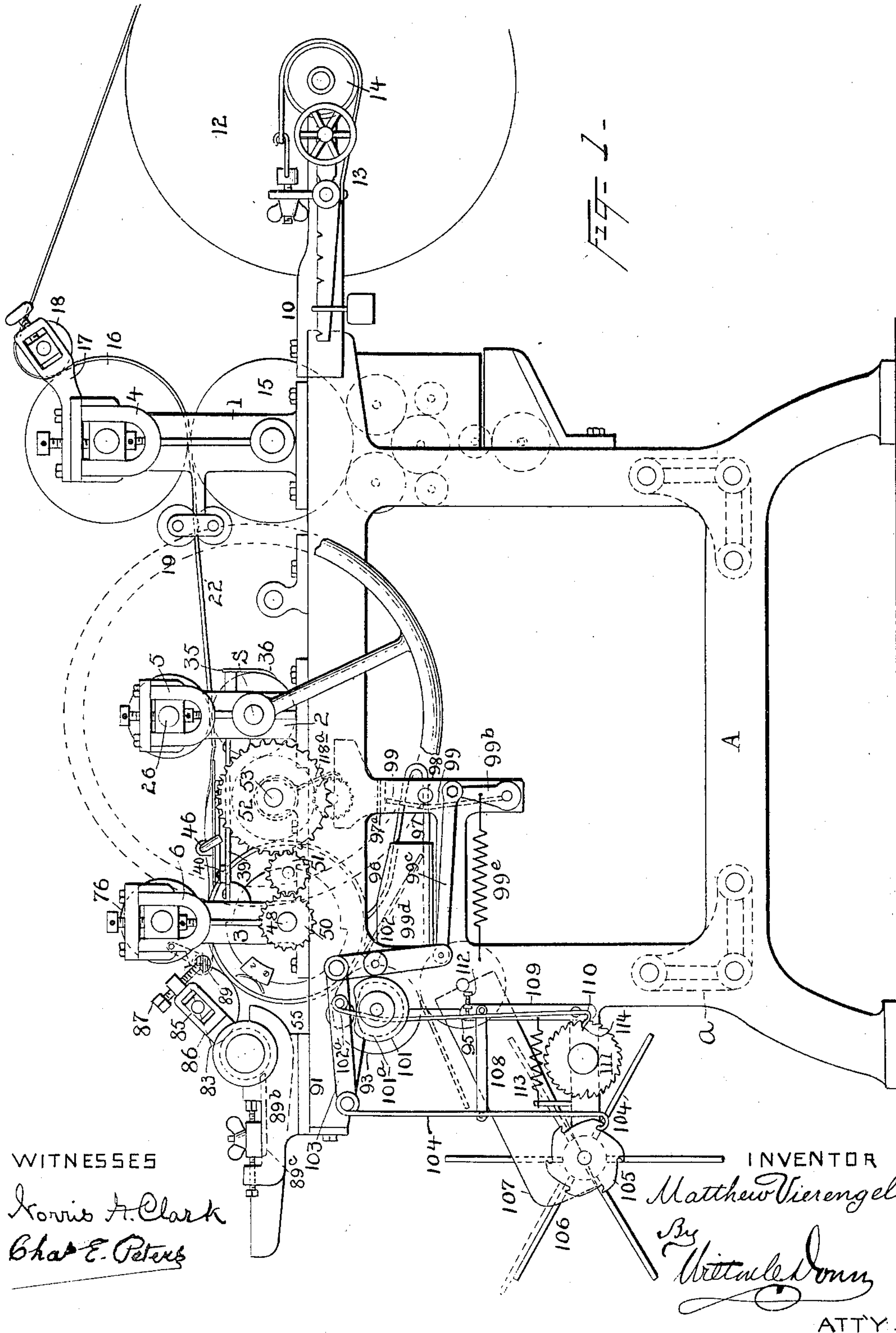
Patented Sept. 4, 1900.

BAG MACHINE.

(Application filed Sept. 15, 1898.)

6 Sheets—Sheet 1.

(No Model.)



THE NORMAN PETERSON CO. PHOTO-LITHO. WASHINGTON, D. C.

No. 657,257.

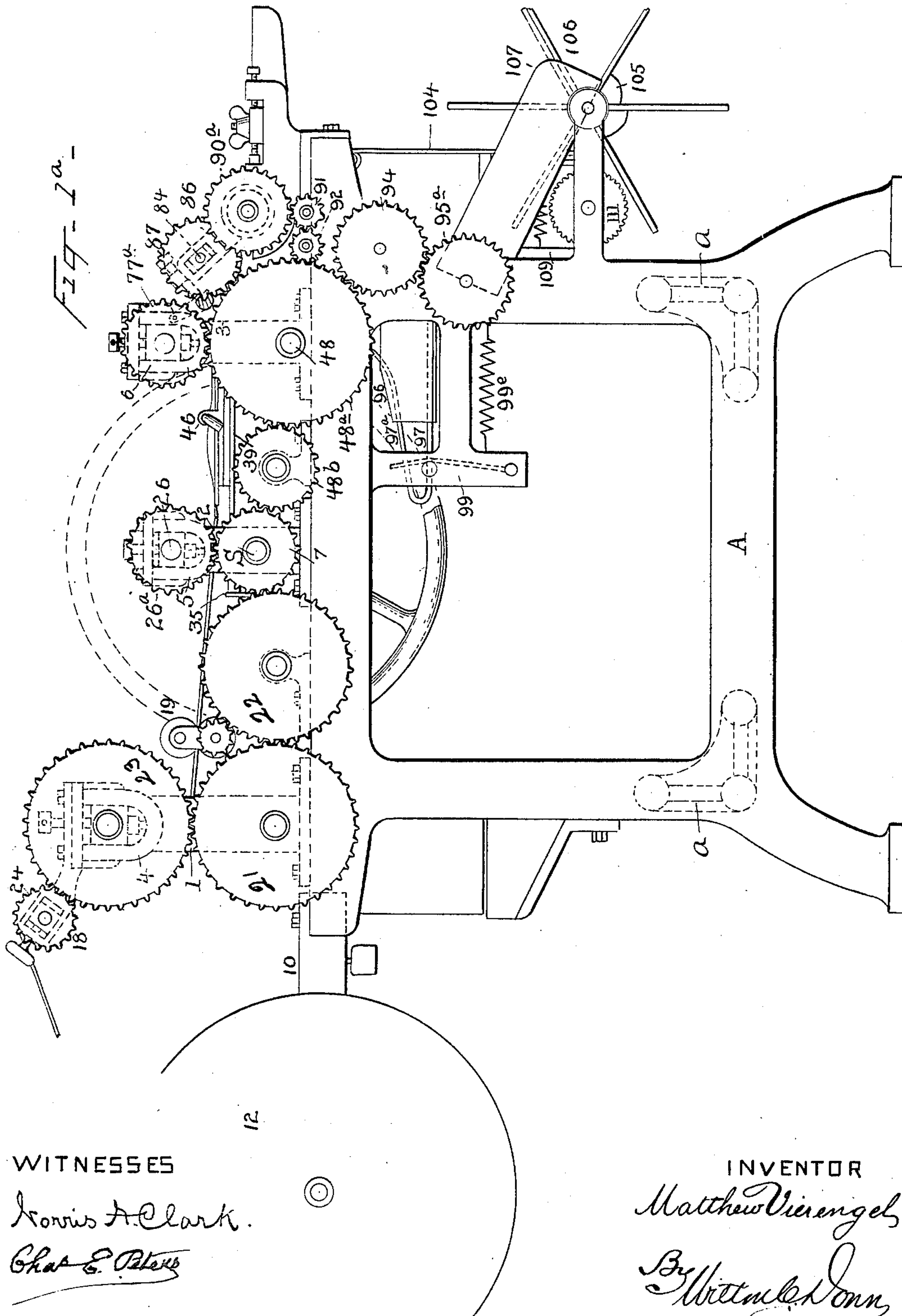
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M. VIERENGEL.
BAG MACHINE.

(Application filed Sept. 15, 1898.)

(No Model.)

6 Sheets—Sheet 2.



WITNESSES

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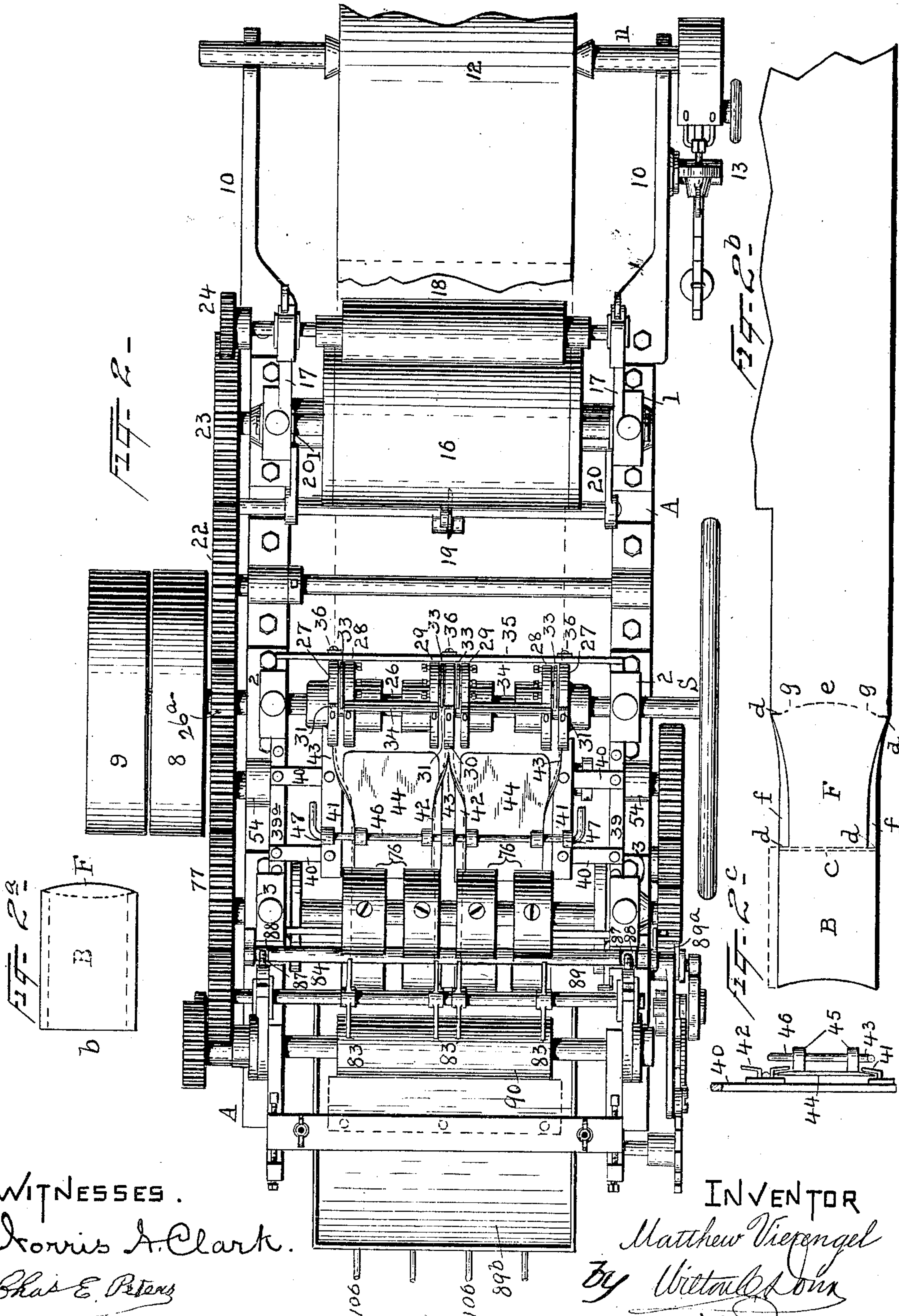
M. VIERENGEL.

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(Application filed Sept. 15, 1898.)

(No Model.)

6 Sheets—Sheet 3.



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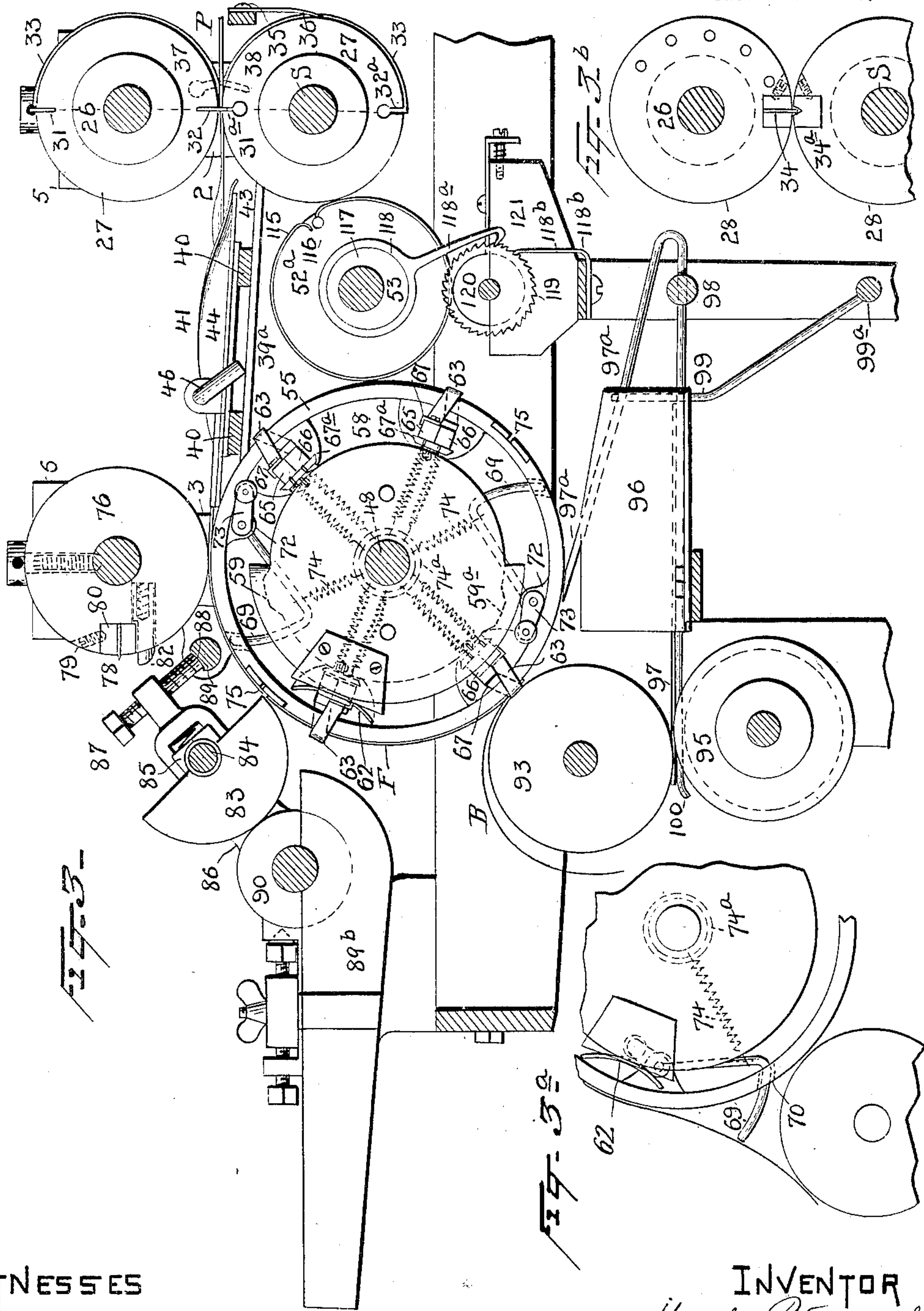
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6 Sheets—Sheet 4.



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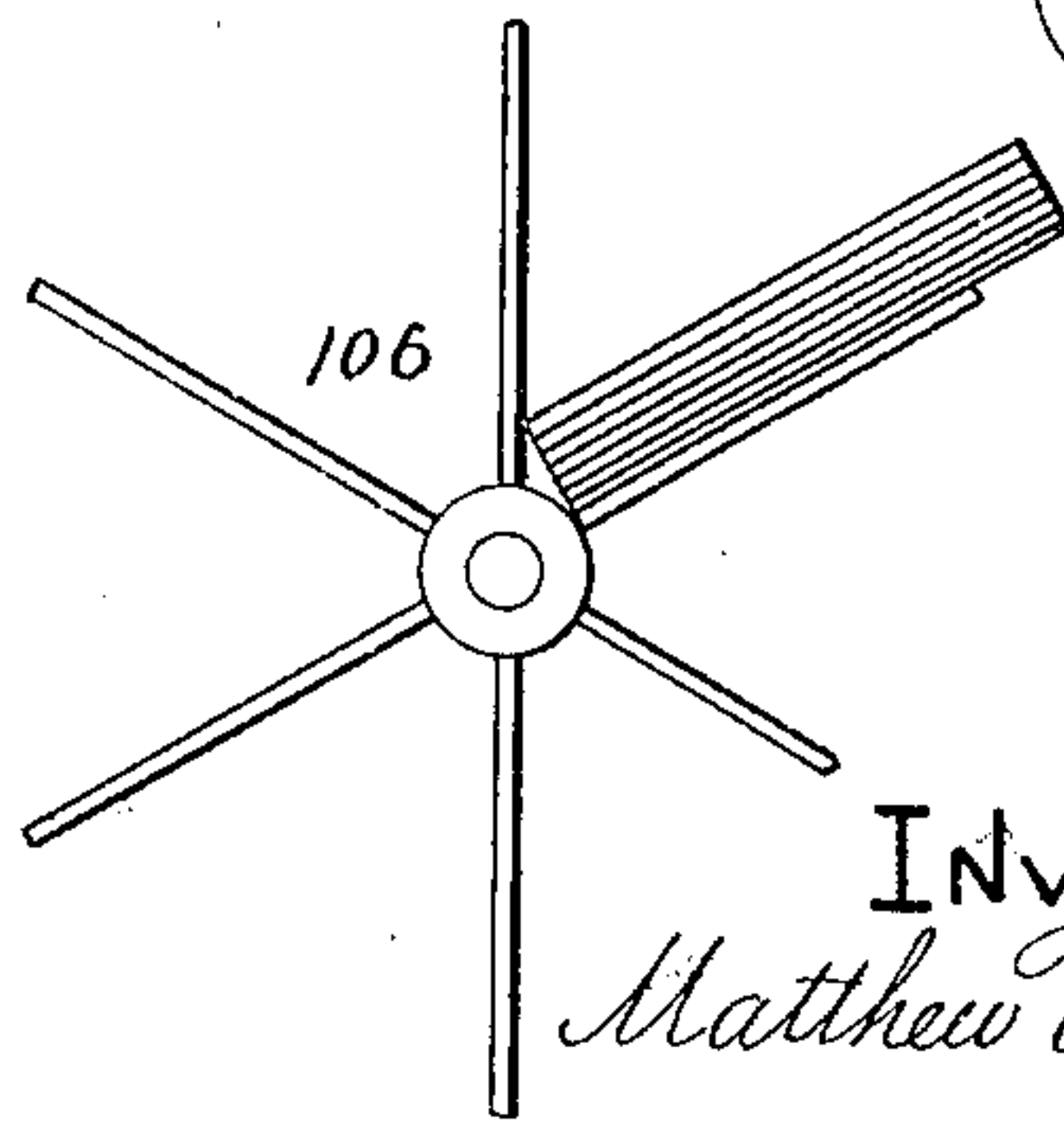
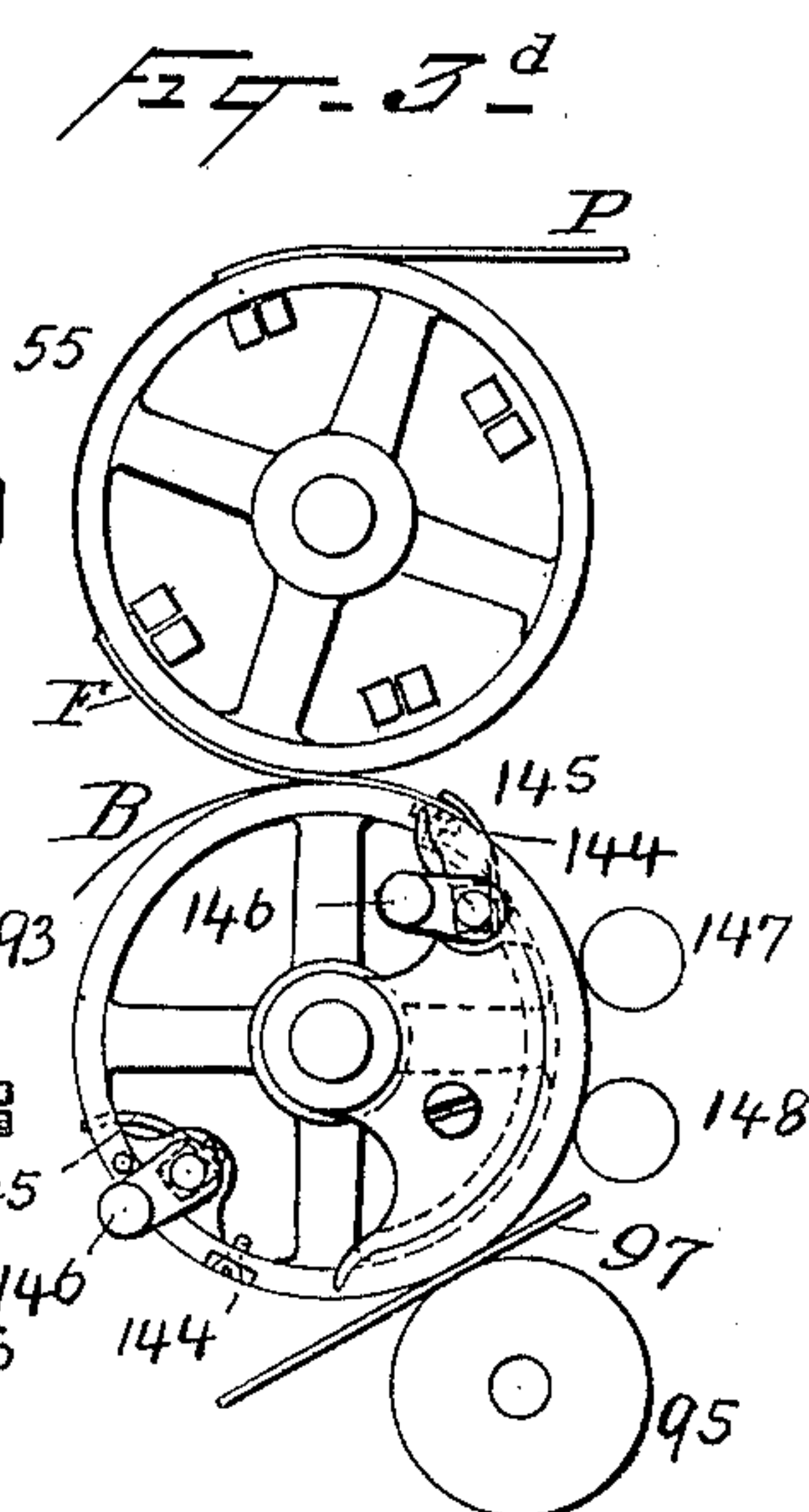
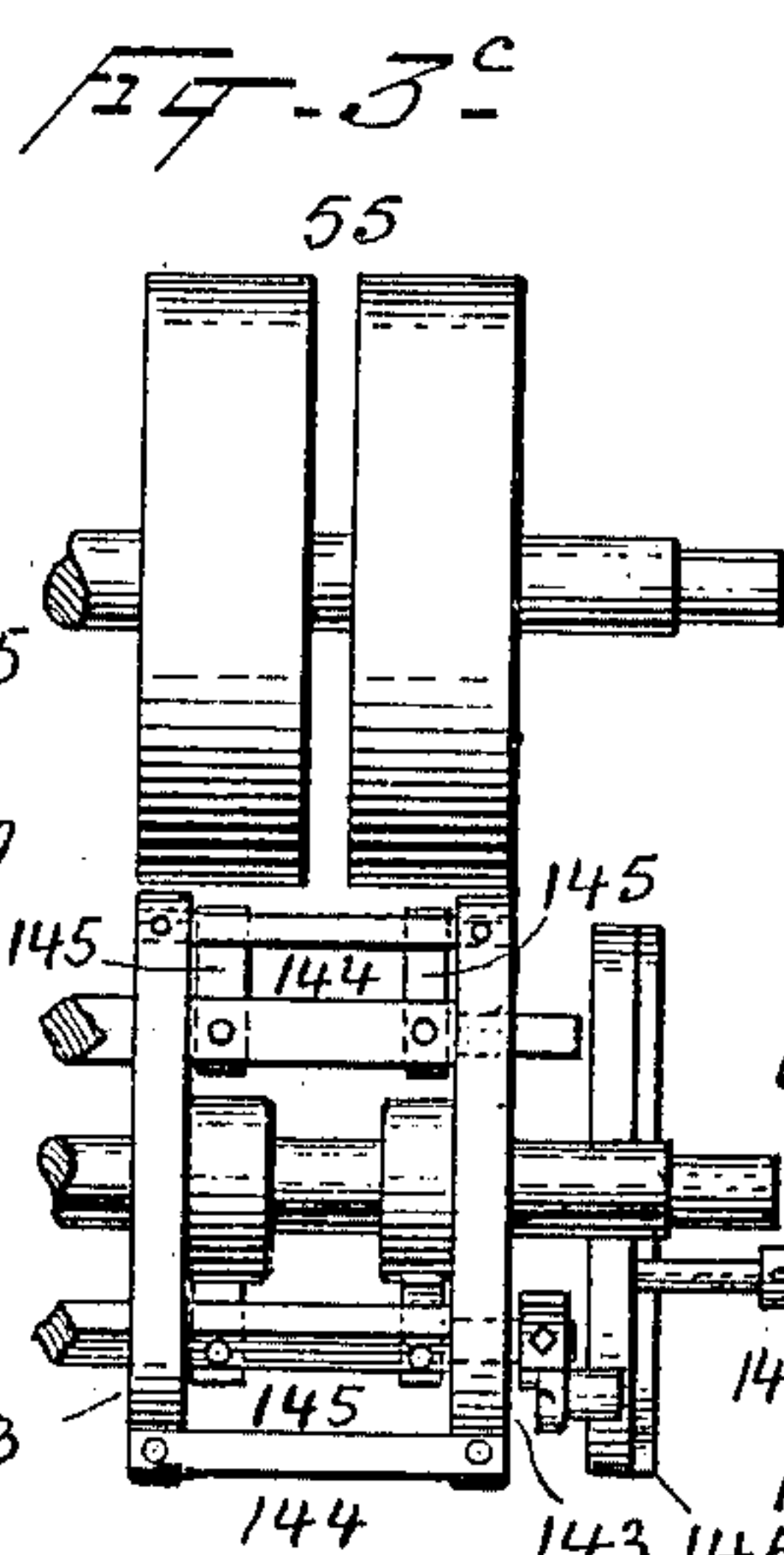
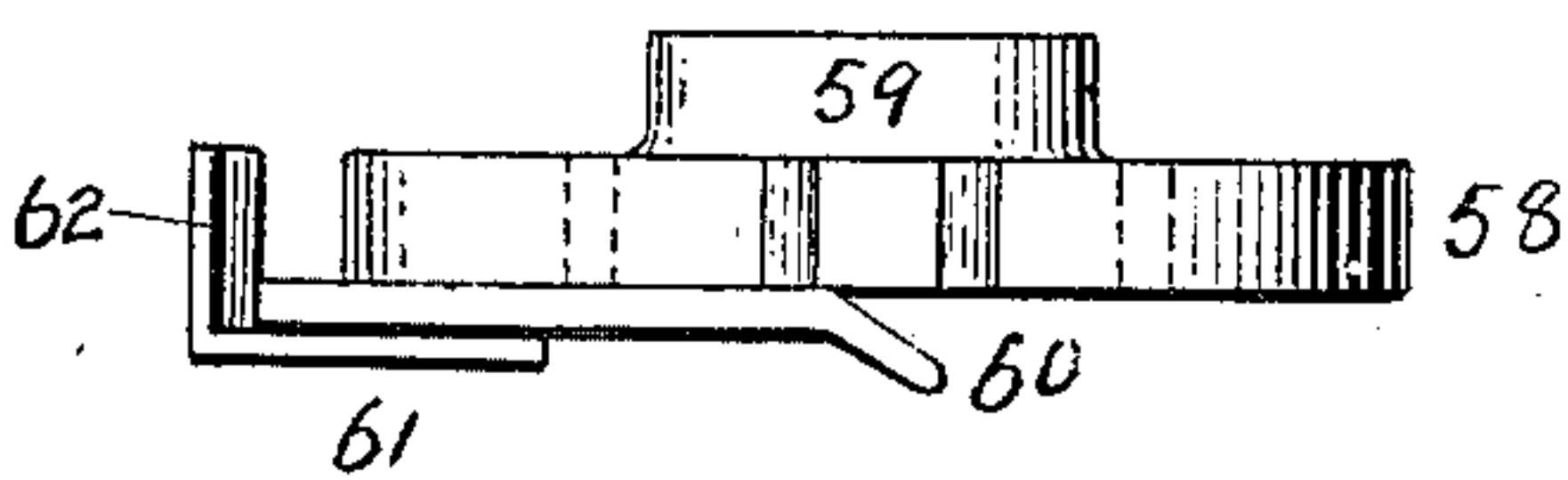
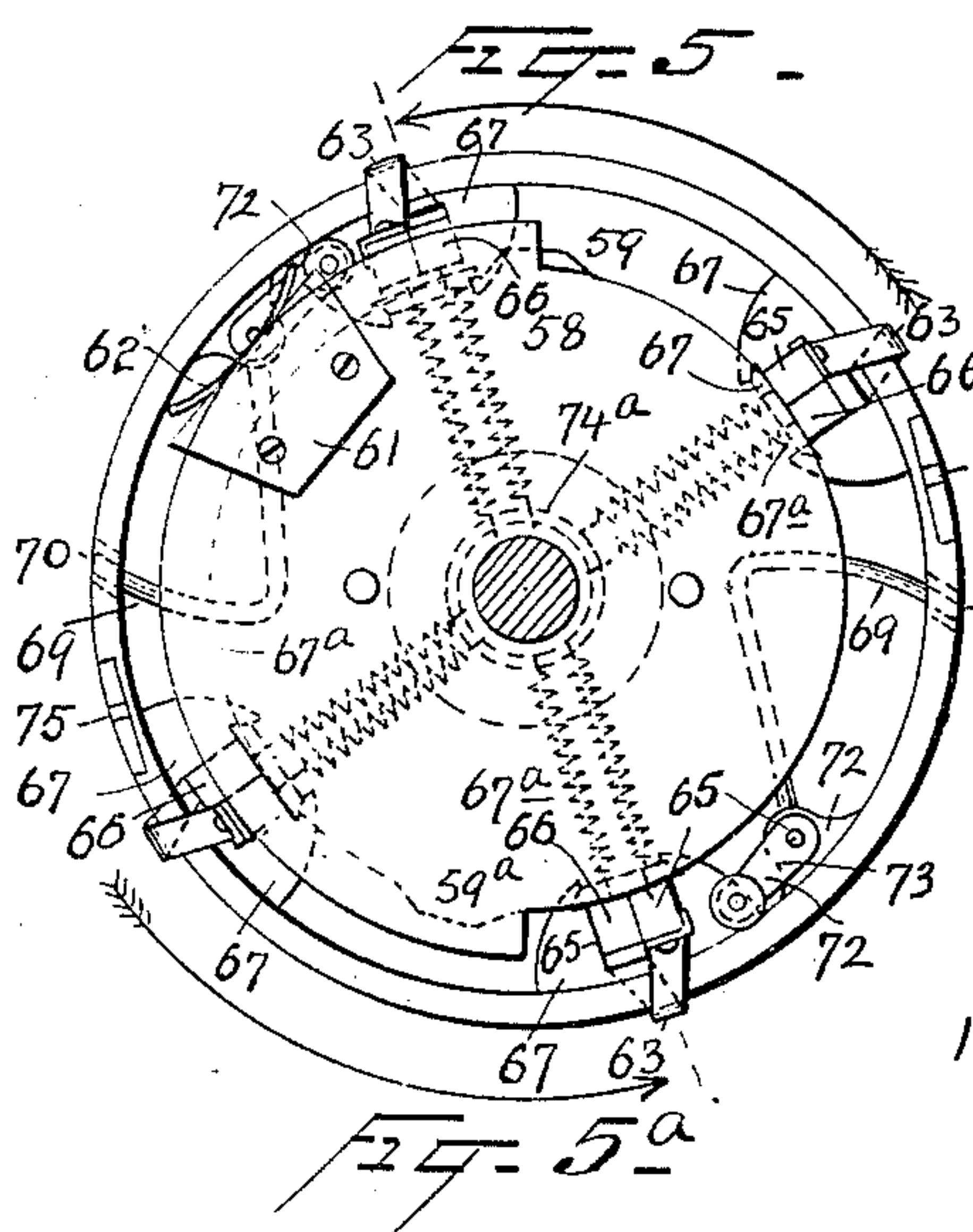
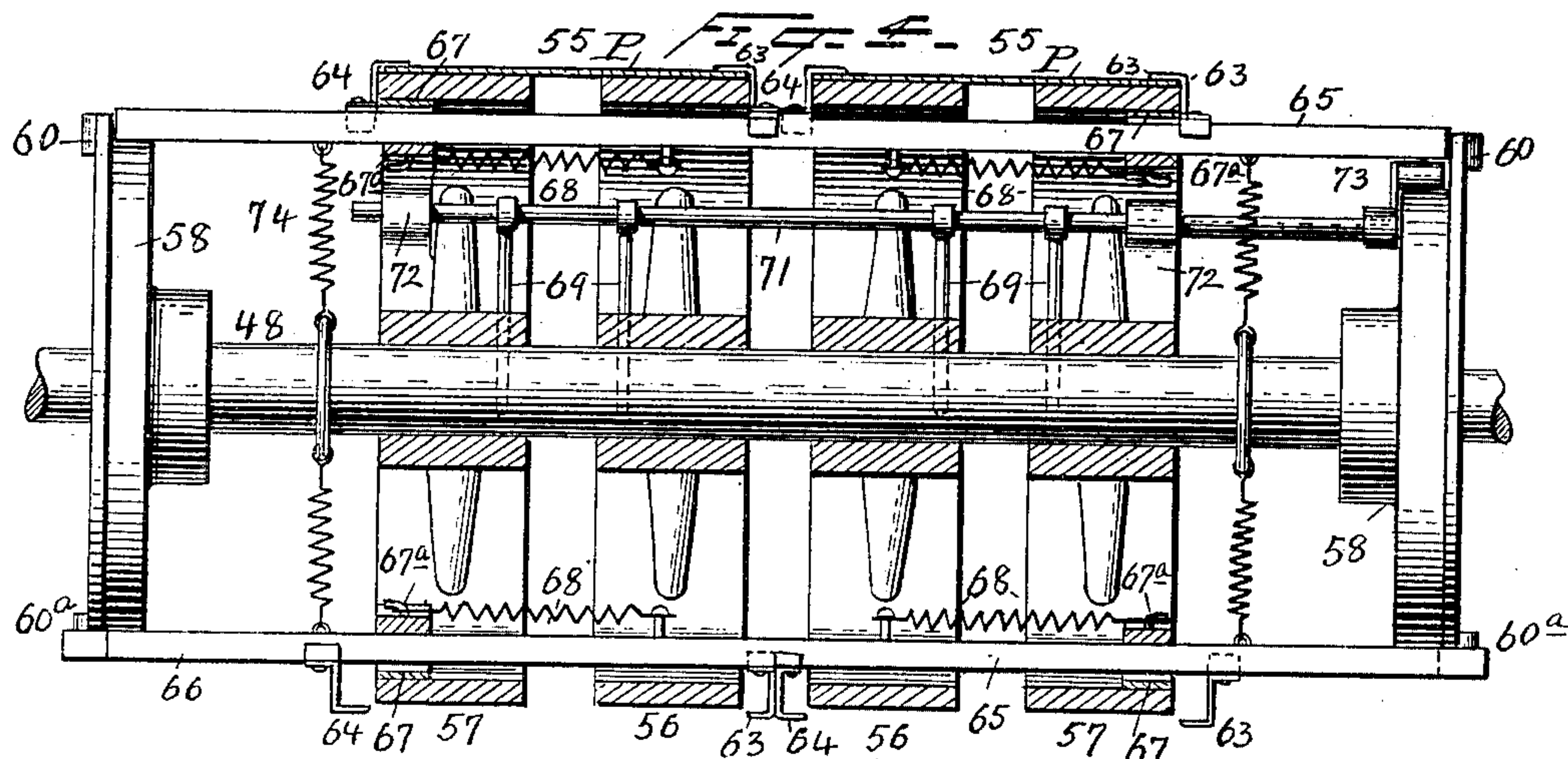
M. VIERENGEL.

BAG MACHINE.

(Application filed Sept. 15, 1898.)

(No Model.)

6 Sheets—Sheet 5.



WITNESSES

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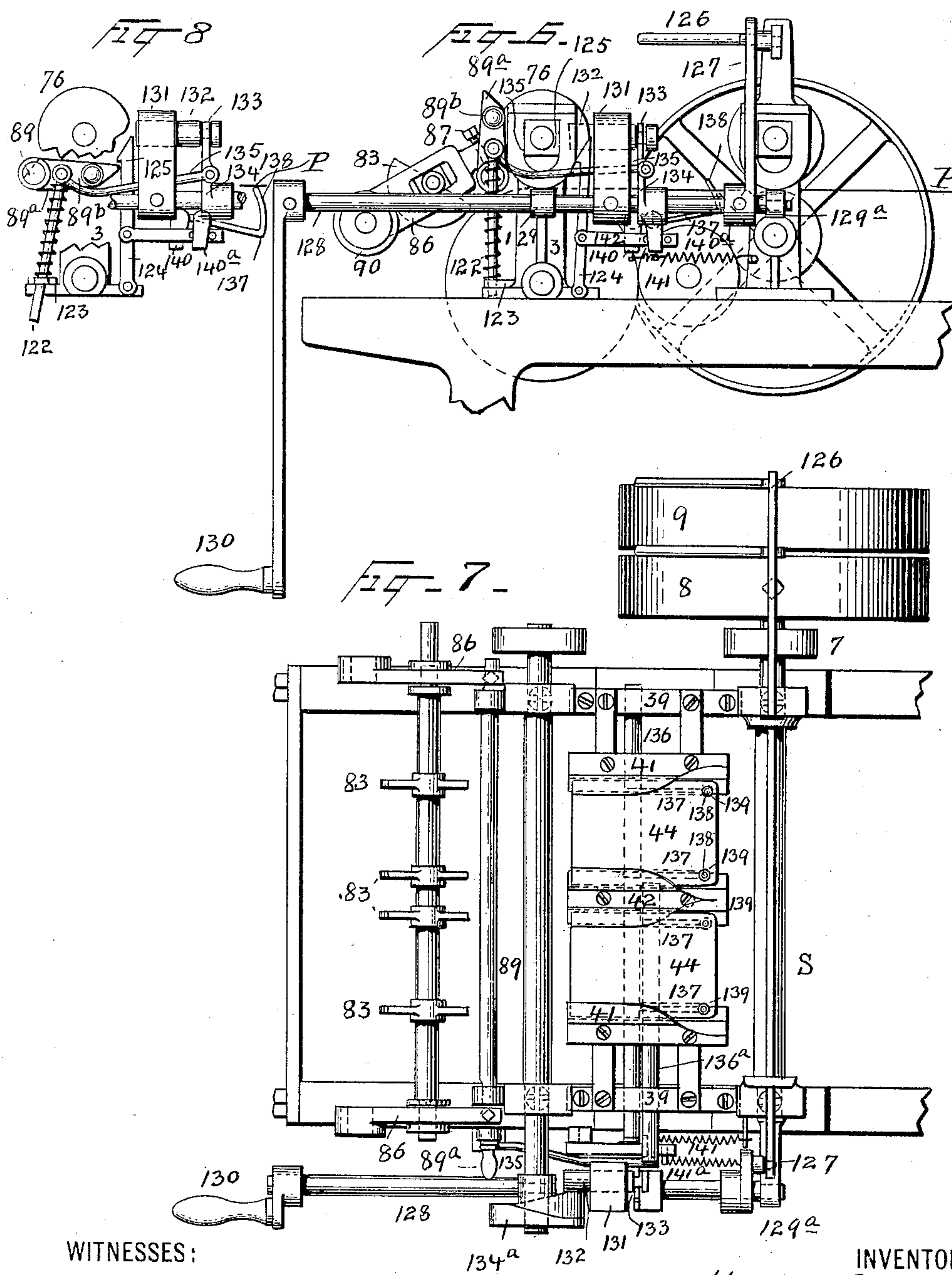
Patented Sept. 4, 1900.

BAG MACHINE.

(Application filed Sept. 15, 1898.)

(No Model.)

6 Sheets—Sheet 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

MATTHEW VIERENGEL, OF NEW YORK, N. Y.

BAG-MACHINE.

SPECIFICATION forming part of Letters Patent No. 657,257, dated September 4, 1900.

Application filed September 15, 1898. Serial No. 691,039. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW VIERENGEL, a citizen of the United States, residing at New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Bag-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that description of machines for making paper bags which are designed and constructed to print and form the blank from a continuous roll or web of paper, gum and fold the blank into a perfect bag, and deliver and collect the bags in bundles of a predetermined number prepared for tying.

It has reference more specifically to machines performing the above operations which are intended, primarily, to manufacture that class of paper bags known and designated as "side-seam" bags, the blanks being folded on the bottom line front to back and completed by pasting the sides of one of those parts to seams or laps on the sides of the other of those parts.

One object of my invention is to control and direct the blanks from which the bags are made while being gummed and folded and by holding them firmly and positively while being carried to and past the cutting-off, gumming, and folding devices prevent the making and delivery of imperfect bags. This part of the invention consists in a carrier for the blanks fitted with grippers arranged for gripping the blank in such a manner that its position with relation to the cutting-off, gumming, and folding mechanism is maintained throughout those operations and without interfering with folding the blank and delivery of the completed bag.

A further object of my invention is to adapt the carrying-cylinder and cutting-off cylinder to retain control of the feeding of the paper to the cutting and creasing seam-folding mechanism and to pull the paper through that mechanism and draw the blank following the blank undergoing the operation of folding into position to be caught by the grippers

of the carrying-cylinder. This part of the invention consists in a cutting-off blade connected with the cutting-off cylinder, constructed to partly sever the blank on the cylinder from the blank immediately behind it, leaving slight connections by means of which the blank held by the grippers will draw the next succeeding blank into the bite of the carrying and cutting-off cylinders preparatory to being caught by the next grippers of the carrying-cylinder.

A further object of my invention is to prevent the deposition of gum on the carrying-cylinder when from any cause there is no blank thereon to receive it. This part of the invention consists in a gumming mechanism connected by suitable devices with contrivances controlled by the paper, whereby so long as the paper passes or is held over those contrivances the gumming-disks are retained in position to apply gum to the seams of the blank; but if the paper ceases to bear upon the said contrivances they are permitted to move, and through connecting mechanism they release the device by which the position of the gumming-disks is regulated, and the said disks are put in position to avoid the surface of the carrying-cylinder.

A further object of the invention is to automatically stop the machine in case the paper breaks or its continuity is interrupted, and this consists in a belt-shifter having a connection with contrivances held in position by the paper, whereby if the paper breaks or its connection with the web on the roll is interrupted the said contrivances are caused to set in motion devices connected with the belt-shifter, which shift the belt from the fast to the loose pulley and stop the machine.

A further object of my invention is to insure the delivery of the completed bags in proper order for forming bundles of a predetermined size, and this consists in a collector located behind the delivering-rolls and connected with the delivering-rolls by suitable mechanism, and also with a registering mechanism whereby its separate division for the reception of the completed bags are held in position to receive the bags during the delivery of the number of bags required to form a bundle, so that when the proper number

has been deposited in a division it is turned out of the way and an empty division brought into position to receive the bags.

A further object of my invention is to remove the offset from the printed blanks from the carrying-cylinder, and thereby avoid soiling the blanks, and this consists in a drum with a blanket adapted to be supplied with a cleansing liquid and to rotate in contact with the carrying-cylinder and thereby remove therefrom any ink offset from the blanks carried by the cylinder.

In the accompanying drawings, Figure 1 illustrates a side elevation of my improved paper-bag machine, the front end of the machine being to the right hand. Fig. 1^a represents an elevation of the opposite side of the machine from that represented by Fig. 1, showing the main gearing of the machine; Fig. 2, a plan of the machine; Fig. 2^a, a completed bag of the kind the machine is designed to make; Fig. 2^b, the web of paper from which the blanks are formed, a nearly-completed blank being shown at one end; Fig. 2^c, a detached rear end view of the folders and folder-plates by which the seams of the blank are folded over on the body of the blank. Fig. 3 illustrates an enlarged sectional side elevation of the machine from and including the cutting and creasing mechanism to the rear end thereof. Fig. 3^a is a detached partly-broken away illustration of the carrying-cylinder and folding-cylinder, the view being intended, primarily, to show the operation of throwing the end of the blank in advance off the carrying-cylinder and over to the rear of the folding-cylinder. Fig. 3^b illustrates the two opposing disks of the cutting and creasing mechanism which adjoin those shown in Fig. 3, this view being designed particularly to represent the creasing-blade in the upper disk and the creasing-groove in the lower disk. Fig. 3^c is a rear elevation, and Fig. 3^d is an end elevation, both on Sheet IV, of a modified construction of the folding-cylinder and delivery-cylinder. Fig. 4 is a longitudinal sectional elevation of the carrying-cylinder on an enlarged scale. Fig. 5 is an end elevation of the carrying-cylinder. Fig. 5^a is an edge view of one of the cams that operate the grippers of the carrying-cylinder. Fig. 6 illustrates a side elevation of the mechanism for automatically lifting the gumming devices out of contact with the carrying-cylinder and for shifting the belt from the fast to the loose pulley to stop the machine, this mechanism being shown in connection with the cutting and creasing mechanism, carrying-cylinder and cutting-off cylinder, and gumming devices. Fig. 7 is a plan of the same, and Fig. 8 represents a detailed view of the mechanism for controlling the position of the gumming devices and the belt-shifter.

The completed bag made by this machine is illustrated by Fig. 2^a, and the web of paper, together with the unsevered blank from which the bag is made, is illustrated by Fig. 2^b.

The blank is made in a single piece, the part that forms the front of the bag being designated by F and the part that forms the back by B. Between the two parts is a transverse crease *c*, in the line of which the "back" is folded over against the "front" to form the bottom *b* of the bag, and on the sides or edges of the front are laps or seams *ff*, which are folded over on the front and gum applied to them, and to these gummed laps or seams the edges of the back are stuck to form the completed bag, Fig. 2^a. The back has strips equal in width to the seams *ff* (indicated by the dotted lines) trimmed off its edges. The waste side strips are separated from the seams by transverse cuts *d d*, and the blank is cut off the web of paper on the broken line *e* after the several parts above mentioned have been formed and before folding and pasting the front and back together. The line of severance *e* between the blanks, which, as indicated, is curved, may be straight, if preferred. The blank in advance is not completely separated from the succeeding blank by the cutting-off mechanism, slight connections *g g* being left in order that the forward blank may draw the following blank after it to where it can be caught by the carrying-cylinder, these connections being broken afterward, as will appear presently. The blank is made and converted into a bag by the machine illustrated in the drawings, which will now be described.

The machine is duplex—that is, it has two complete sets of blank forming, folding, gumming, and delivery mechanism arranged side by side and operated from the same driving mechanism—and is thus designed to make and deliver two completed bags at the same time. Both bags thus made will necessarily be of the same length, but their width may be the same or different, as desired.

The frame of the machine consists of side members *A A*, connected together by transverse members *a a*. (Seen in broken lines only in Fig. 1.) Upon the top plates of the side members are bolted standards 1 1, 2 2, and 3 3, provided with suitable fixed bearings for the shafts of certain rotary parts of the machine and have their upper ends formed into inverted-U-shaped housings 4 5 6, respectively, to receive the adjustable boxes, in which are journaled the shafts of other rotary parts that coöperate with those first referred to. The main driving-shaft *S* is journaled in the bearings in the standards 2 2, and it carries on one end a balance-wheel and on the opposite end a pinion 7, and outside of this fast and loose pulleys 8 9. At the front end of the machine are arms 10 10, bolted to the top plates of the frame, that have near their outer ends slotted bearings, in which is hung a shaft 11, that carries the web or roll of paper 12, from which the bags are made. A braking device 13 is attached to one of the arms to act on the friction-wheel 14 on the end of the shaft 11 for the purpose of controlling the de-

livery of the paper from the roll and preventing it from becoming slack. In the bearings in the lower part of the standards 11 the shaft of the printing-cylinder 15 is mounted, and above this is an impression-cylinder 16, the shaft of which is held in bearings in adjustable boxes in the housings 4. On top of the housings 4 are arms 17 17, that project toward the front of the machine and carry in suitable adjustable bearings a feeding-roll 18, between which and the impression-cylinder the paper is passed and fed downward to the printing-cylinder, which prints the backs and fronts of the blanks, two forms being arranged side by side on the cylinder to print two blanks at the same time. The web of paper is wide enough for two blanks, and the printing is done before the paper is split; but immediately behind the printing-cylinder is a rotary cutter 19, consisting of two cutting-wheels mounted between the arms 20 20 on a shaft and geared to rotate together. The cutter 19 being laterally movable on the shaft, it can be adjusted to split the paper after it is printed between the two printed blanks, whether they are of equal or unequal width.

The printing-cylinder shaft carries on its right-hand end outside of the frame a toothed wheel 21, that, on the one hand, is geared, through an idle wheel 22, with the pinion 7 on the main shaft S and, on the other, engages a toothed wheel 23 on the shaft of the impression-cylinder 16, and the wheel 23 engages a toothed wheel 24 on the shaft of the feeding-roll 18. The blank cutting and creasing mechanism is connected with the main or driving shaft S and a shaft 26, supported in boxes in housings 5 5 in standards 2 2 immediately above shaft S, shaft 26 carrying a toothed wheel 26^a, which is engaged by the pinion 7 on shaft S.

The duplication of the mechanism commences with the blank cutters and creasers, and the several devices of the two sets that perform the successive corresponding operations on the blanks are arranged side by side, so that the two blanks are formed, gummed, folded, and the completed bags delivered simultaneously. In the following description the mechanism of but one set will be referred to, except where there is a device or contrivance common to both, and where the devices or contrivances are exact duplicates of one another they will be designated by the same reference letter or figure.

The cutting and creasing mechanism consists of disks 27 28 29 30, mounted on shaft 26, and corresponding disks mounted on the shaft S. Each set contains the disks 27 28 29, but disk 30 is common to both sets, being placed between the disks 29 29 of the two sets. These disks have hubs for the shafts to pass through, and they are fastened on the shaft by means of set-screws passed through said hubs. At opposite points on the periphery of disk 27 on the upper shaft 26 are two cutting-blades 31 32, fixed transversely therein,

and at corresponding points in the periphery of the disk 27 on the shaft S there are transverse grooves 31^a 32^a. (See Fig. 3, Sheet III.) Between disks 27 28 on both the upper and lower shaft are semicircular cutting-blades 33 33, which extend from the transverse blades 31 to 32 in the upper disks and from grooves 31^a to 32^a in the lower disks and are secured by set-screws passed through the disks 28. By reference to Figs. 3 and 3^b the position of these transverse blades and grooves and the upper and lower semicircular blades can be seen, and it will be noticed that the transverse blade on the upper disk enters the corresponding groove in the lower disk and the upper and lower semicircular blades overlap and form semicircular shears. Similar transverse cutting-blades are arranged in connection with the disk 30, (both the upper and lower;) but the upper only is shown. (See Fig. 2.) Also there are similar semicircular cutting-blades 33 for the disks 29 on both the upper and lower shafts.

The purpose of the transverse cutting-blades 31 32 and the grooves 31^a 32^a is to make the transverse cuts *d d* in the two edges of the blank and the semicircular cutting-blades 33 33 trim the waste off the back part of the blank between the cuts *d d*. As the center transverse blades on the disks 30 are designed to make the transverse cuts *d d* for both blanks, it will be understood that each of these blades must extend from the semicircular blades that trim off the waste of one blank to the one that trims it off the other, and the groove in the lower disk 30 must be correspondingly wide.

Between the disks 28 29 on the upper shaft and in line with the transverse blades 31 31 is a creasing-blade 34, the ends of which are inserted in the peripheries of the said disks, and between the corresponding disks 28 29 on the lower shaft is a plate with a groove 34^a set in the peripheries of the disks. The creasing-blade is shown in Fig. 2; but the plate with the groove 34^a is shown in end elevation only in Fig. 3^b. This creasing-blade, in connection with the groove, makes the creased-bottom line *c* in the blank.

In front of the creasing and cutting devices on shaft 26 is a transversely-placed bar 35, bolted to arms extending out from the standards 2 2. To this bar slotted fingers 36 36 36 are fixed directly in front of the lower disks 27 and 30. In the peripheries of each of the upper disks 27 30 is a socket 37, and in the corresponding lower disk is a pin 38. The said pins and sockets and the slotted fingers 36 are in such relation to the edge-trimming blades and the transverse cutting-blades that when the waste strips are cut off from the blank the pins which follow just behind the transverse cutting-blade penetrate the waste strips, thus catching the said strips and holding them on the peripheries of the disks until the pins reach the fingers 36, which pass under the strips and clear them away from

the disks, the slots in the fingers receiving the pins, so that the fingers can pass under the strips.

Between the standards 2 3 on each side and
5 extending from one to the other are bars 39 39^a, the ends of which are bolted to lugs on the standard. These bars are joined transversely by bars 40 40, screwed on top of them. To the bars 40 40 folders 41 42 are fastened
10 directly behind the cutting and creasing mechanism, 41 being in line with the outer-edge-trimming blades and 42 being in line with the inner-edge-trimming blades. The folders are of usual construction, consisting
15 of a flange that makes a half turn or twist in its length, the forward end 43 where the flap first comes in contact with it being flush with the base, but curving over gradually until at about midway of its length, and from there on
20 to its rear end it is parallel to, but not in contact with, its base-plate. Between each set of folders, with its edges under the curved flanges, but not in close contact therewith, is a plate 44, which is held in place by its connection with the ears 45 on the rod 46, laid
25 transversely across the top of the frame and passed through holes in the lugs 47 47.

In the lower part of the standards 3 3 is a shaft 48, having on one end a toothed wheel,
30 that through an idle wheel 48^b is in gear with the pinion 7 on the main shaft, and on the opposite end a pinion 50, that communicates motion through an idle wheel 51 to a toothed wheel 52 on the shaft 53, supported in bearings 54 54 on the frame. On the shaft 48 the
35 blank-carrying cylinder 55 is mounted. This cylinder is made in two parts 56 57, the latter being movable on the shaft in order that the length of the carrying-cylinders may be
40 changed to accommodate blanks of different widths. Outside of each cylinder is a cam 58, bolted to the frame, through which the shaft 48 passes. On the periphery of each of these
45 cams there are projections 59 59^a, and on the outer sides of these cams there are flanges that extend outside the projections 59 59^a, and at or about the line of the projections 59 59^a these flanges are turned outward at a sharp angle, forming thus lateral projections 60 60^a.
50 On the outer side of one flange a plate 61 is bolted, and the part of this plate above the flange is bent inward at a right angle, so as to project over the cam 58, and the projecting part is formed into an inverted curved cam 62.
55 63 64 are grippers placed at both ends of the carrying-cylinder to grip the four corners of the blank. There are two sets of these grippers on each cylinder, one set for each blank, (the cylinder being adapted to take
60 two blanks at each revolution.) As illustrated in Figs. 3 and 5, the two on the lower part of the cylinder form one set, the foremost grippers of each set being used to grip the forward corners of the part F of the blank,
65 and the following grippers take the rear corners, the arrows connecting the grippers indicating the positions and direction of move-

ment of the cylinder. The use of two sets of grippers on each carrying-cylinder is, however, arbitrary. A greater or less number
70 may be employed, if desired. The grippers that act upon the opposite ends of the cylinder are screwed, respectively, to parallel bars 65 66, which are passed through the two cylinders and held in guides 67, screwed or cast
75 on the inside of the cylinder, so that they can slide longitudinally parallel to each other. The opposite ends of the bars project over the cams 58, so that they will be acted upon by the projections 59 59^a, while a sliding motion will be given them in opposite directions
80 by the lateral projections 60 60^a. Grippers 63 63—that is, those which act upon the left-hand edges of the two blanks—are connected with the bar 65, while the grippers 64 64, that
85 grip the right-hand edges of the blank, are connected with the bar 66. Thus the cams on the left hand close the grippers 63, while the right-hand cams close the grippers 64. The grippers are opened by the springs 68 68, one
90 each of which is connected at one end with one of the bars and at the other end with a hook on the beveled cap 67^a in the guides 67 on the cylinder, as shown, so that when the bars pass the cams the springs pull the bars
95 back, and thus move the grippers away from the ends of the cylinders, as shown at the bottom of Fig. 4.

Between each set of grippers there are fingers 69 69, arranged to pass through openings
100 70 70 in the cylinders. These fingers are of a general rectangular form, the ends being curved slightly to correspond to the arc of the circle in which they move when they are caused to pass through the openings in the
105 cylinder. The cylinder has two sets of these fingers, each hung upon a rod 71, supported in projections 72 on the cylinders. One end of each of the rods is extended to the cam 58 on the left-hand side of the machine and carries a crank 73, that projects over the periphery of the cam in position to be acted upon
110 by the cam 62. When the cylinders are in motion, the cranks 73 come in contact with and are turned downward by the cams 62, thereby turning the rods 71 and causing the fingers on the rods to be thrust through the openings in the cylinder, as shown in Fig. 3^a,
115 and when the cam is passed the fingers are drawn back in the cylinders by the springs 74, which are connected with the fingers and a ring 74^a. (Shown in broken lines, Fig. 3.) One of the functions of these fingers is to tear the forward end of the blank held by one set of grippers from the rear end of the blank
120 held by the preceding set—in other words, to break the connections *g g* between one blank and the one immediately behind it. Another function is to throw the end of the part of the blank torn from the preceding blank away
125 from the carrying-cylinder and far enough over the folding-cylinder (hereinafter described) to slide down to the rear of the said folding-cylinder preparatory to being folded

up against the part of the blank held by the grippers on the carrying-cylinder, as will be described more fully hereinafter.

Behind the rearmost of each set of grippers a plate is set in the surface of the cylinder, which connects the two parts of the cylinder, and in this plate is a longitudinal groove 75, that is intended to coact with the cutting-off blade, by which the blank on the cutting-cylinder is partly severed from the blank immediately following it.

Above the carrying-cylinder is a cutting-off cylinder 76, similar to the carrying-cylinder in that it is in two parts, but only half its diameter. This cutting-off cylinder is mounted on a shaft journaled in bearings in boxes held in the housings 6 and carrying a toothed wheel 77^a, which is engaged by the toothed wheel on the shaft of the carrying-cylinder, that is driven by the pinion 7 on the driving-shaft. In the cylinder 76 is set the cutting-off blade 78 and held by screws 79, screwed into the parts of the cylinder diagonally until their points bear against blocks 80, (only one of which is shown,) in which the blade is set, as illustrated in Fig. 3. This blade coacts with the grooves 75 in the carrying-cylinder and cuts off the blank carried by the cylinder directly after its rear end has been secured by the hindmost pair of grippers of the set. The cut, however, is not complete, the narrow uncut connecting portions *g g*, Fig. 2^b, being left by notching the cutting-off blade for the purpose of retaining connection with the succeeding blank in order that it may be drawn into the bite of the carrying-cylinder and cutting-off cylinder, the breaking of these connections being effected by the action of the fingers 69 69, as mentioned heretofore. Immediately behind the cutting-off blade (referring to the order of action of the parts) is a pin 82, inserted in a socket formed in the periphery and held there by the block 80, the inner corner of which bears against a shoulder on the inner end of the pin, as shown in Fig. 3. The pin is forced out by a spring socketed in its inner end and bearing against the bottom of the pin-socket. These pins are designed to bear upon the end of the blank succeeding the one on the carrying-cylinder and hold the end in advance down upon the cylinder until caught between the cutting-off and carrying cylinders.

The gumming apparatus consists of a series of semicircular disks 83 83, &c., on a shaft 84, supported in adjustable boxes 85 85 in housings in the ends of arms 86 86, which are collared at their opposite ends and hung on the ends of the fountain-roller shaft, hereinafter referred to. The upper ends of the arms are fitted with set-screws 87 87, the points of which rest in slots 88 88, cut into the rod 89, which is hung in the ears projecting from the housings 6 and carries on one end a handle 89^a. By means of the screws 87 the gumming-disks are adjusted relatively to the carrying-cylinder, so as to bear against the exposed surface

of the blank-seams to apply gum to them; but when it is not desired to apply gum to the seams or to prevent smearing the surface of the carrying-cylinders with gum when no blanks are on the cylinder the gumming-disks are lifted away from the cylinder by giving a partial rotation to the rod 89, whereby the points of the set-screws are caused to pass out of the slots and rest upon the rounded part of the rod. By this means the disks are lifted far enough to prevent any contact with the cylinder.

89^c is a scraper to scrape the superfluous gum from the fountain-roll 90.

As above described, the placing of the gumming-disks out of contact with the blank or cylinder is effected by hand; but it is intended that it shall be done automatically, if the necessity of doing so arises from the breaking of the paper or if the paper is defective or not continuous through the entire roll. The mechanism for this purpose is represented in Figs. 6, 7, and 8, Sheet V, and will be described presently. The disks receive motion from the carrying-cylinder shaft, the toothed wheel on that shaft engaging a toothed wheel on the shaft that carries the disks. The gumming-disks are narrower than the seams *f f* of the blanks, and they are arranged so that when the blanks arrive in proper position the revolution of the disks has brought their peripheries in position to make contact with the seams and apply the gum thereto.

89^b is a fountain for holding the gum. 90 is a fountain-roller on a shaft carrying a toothed wheel 90^a, that through intermediate wheels 91 92 is in gear with the toothed wheel 48 on the shaft of the carrying-cylinder.

In the rear of the blank-carrying cylinder and at a point below the center a roller 93, made in sections or parts like the carrying-cylinder, is mounted on a shaft supported in bearings in the frame and carrying a toothed wheel 94 on one end that engages the toothed wheel 48 on the shaft of the carrying-cylinder. Below the roller 93 is a roller 95, mounted on a shaft carrying a toothed wheel 95^a on one end that engages the toothed wheel 94, so that these two rollers and the carrying-cylinder being thus geared together operate and retain their relative positions at all times. Roller 93 is intended to aid in removing the back part of the blank which is in advance from the cylinder after it is released from the grippers and afterward to fold it up against the front part of the blank and cause its edges to adhere to the seams of the front. The roller 95 is intended to coact with roller 93 to further press the completed bag after it has been folded and released from the carrying-cylinder and to deliver it to the collecting apparatus. Directly under the carrying-cylinder plates 96 are fixed in an upright position. They extend nearly to the carrying-cylinder, and they are so placed or arranged that they receive the completed

bags as they are released from the grippers of the carrying-cylinder, and as they fall these plates guide them and cause them to be deposited perfectly straight on the fingers 5 97. These fingers form the platform for receiving the bags. They are supported at their forward ends by a rod 98 and extend between the cylinders 93 95, the latter being grooved to permit them to be passed between. 10 Branches 97^a of these fingers extend up to the carrying-cylinders between the grippers and, bearing against the same, serve to strip off the bags if they adhere after being released from the grippers. Between the horizontal fingers 15 upright fingers 99 project. These fingers are in position to serve as a stop for the ends of the bags as they drop on the fingers 97. At their lower ends these fingers 99 are fixed in a shaft 99^a, supported in downward projections of the 20 frame and carrying at one end an arm 99^b, which is connected by means of a link 99^c with the pendent arm 99^d on the stud of the lever 103. A cam 101 on the end of the shaft of the folding-cylinder 93 is arranged to bear 25 against the roller 102 on the arm 99^d, and thereby oscillate said arm, whereby through the link 99^c and arm 99^b the fingers 99 will be vibrated to the position indicated by the dotted lines in Fig. 1, and when the bag falls 30 on the fingers 97 it will be deposited in the rear of the upright fingers, and when the lower part of the cam arrives at the roller 102 the spring 99^e, acting on the arm 99^b, will throw the fingers back against the end of the 35 bag, which will thereby be driven between the rolls 93 95, by which it will be caught, drawn through, and delivered to the collecting apparatus. On the shaft of rollers 93 is another cam 101^a, the projection of which 40 bears against a roller 102^a on the arm 103. At the end of this arm is pivoted a pendent pawl 104, which bears against a ratchet-wheel 105 on the shaft of a revolving collector 106 at the end of the trough 107, on the pins of 45 which the envelopes are delivered from the rolls 93 95. The pawl 104 is further connected by means of a link 108 with an arm 109, by which it is held against the ratchet-wheel. Another pawl 110 depends from the 50 arm 103 and bears against the teeth of a ratchet-wheel 111, where it is retained by means of a set-screw 112, passed through an ear on the edge of the arm 109. The pawls 104 110 are caused to bear against the ratchet- 55 wheels 105 111 by a spiral spring 113, that connects at one end with the arm 109 and at the other with a stud. The action of the spring is resisted by the set-screw bearing against the arm of pawl 110. The ratchet-wheel 111 60 has one of its teeth 114 cut deeper than the others, so that the pawl can move farther in toward the center of the wheel when it reaches this tooth than at any other part of the wheel. By the greater distance of its 65 movement its arm retreats from the point of the set-screw 112, and this further motion allows the spring 113 to pull the arm back, and

thereby move the pawl 104 into engagement with one of the teeth of the ratchet-wheel 105 preparatory to turning the collector 106 to 70 bring another set of its pins into position to receive the bags. The arm 103 is lifted by the cam 101^a at the moment the pawl 104 is in position to engage a tooth of the ratchet 105, and thereby turns the collecting device 106 75 the distance required to bring a set of pins in position to receive the bags as they are delivered. Cams 101 101^a may be separate or made in one solid piece, as preferred.

The blanks being printed before reaching 80 the carrying-cylinder and the printed sides being pressed against the carrying-cylinders, means are provided for cleansing the surface of the cylinder of any "offset" from the printing that may adhere to its surface. For this 85 purpose the drum 52^a is provided. It has a blanket 115 drawn taut around it, the ends of which are carried into the slot 116 and secured in any suitable manner. On the shaft 53, that carries the said drum, is an eccentric 90 117, on which is placed a ring 118, carrying a pawl 118^a, that engages a ratchet-wheel 119 on a roller 120 in a trough 121, that contains the cleansing fluid, (paraffin-oil, benzene, or other suitable material.) The drum 52 ro- 95 tates in the opposite direction from that of the carrying-cylinder 55, and as it is in contact with the surface of the cylinder the blanket rubs against it. The blanket is supplied with the cleansing fluid from the trough 100 by means of the roller 120, which is moved the distance of one tooth at every revolution of the drum 52 by means of the eccentric operating through the pawl 118^a on the ratchet-wheel 119. By this means a constant supply 105 of the cleansing fluid is carried to the blanket, and the surface of the cylinder is kept free from ink by the rubbing and cleaning action of the blanket and fluid. A spring-pawl 118^b stops the roller 120 and prevents it from being 110 moved back by the action of the drum 52.

The cleansing mechanism above described may be dispensed with, if desired, for some classes of printing; or the parts of the cylinder over which the printed surface passes may 115 be cut out deep enough to prevent contact with the printed surface of the blank.

The mechanism for automatically moving the gumming-disks out of contact with the carrying-cylinder and shifting the belt to the 120 loose pulley is represented by Figs. 6, 7, and 8 on Sheet V. The arm 89^a of the handle 89^b on the end of the rod 89 is pivoted to the upper end of a spring-bar 122, the lower end being passed through a guide 123. The spring on the 125 bar bears against the guide and also against the pivoted end of the bar, so that when retracted it tends to throw the bar, and with it the arm, upward from the horizontal position shown in Fig. 8 to a perpendicular position 130 shown in Fig. 6. The free end of the arm is beveled upward. Forward of the standard 3 a catch-bar 124 is pivoted at its lower end in an upright position and has a catch 125 in

its upper end on the side next to the beveled end of the arm 89^a.

126 is a belt-shifter connected with a crank 127, mounted on a rod 128, supported in brackets 129 129^a, projecting, respectively, from standards 2 3 and provided with a handle 130 for shifting the belt by hand when desired. As it is intended that the belt shall be shifted automatically, so as to stop the machine in case of a break or an imperfection occurring in the paper, the belt-shifter is connected with the mechanism for automatically moving the gumming-disks away from the carrying-cylinders in the following manner: On the belt-shifter rod 128 is a crank-arm 131, having at its upper end a sliding crank-pin 132, passed through a hole in the crank-arm, so as to slide parallel to the belt-shifting rod. The head of the said crank-pin is engaged by a yoke 133 on an arm 134 on the belt-shifting rod, which is adapted to slide on the said rod. The end of the sliding pin is adjacent to the cam 134^a on the end of the shaft that carries the cutting-off cylinders 76. The said arm 134 is also connected with one end of a bent rod 135, which at the opposite end connects with the pivot on the arm 89^a. The said rod is bent downward to pass under the handle 89^b and sidewise to reach the arm 134. Underneath the plates 44 44 of the folding mechanism are two shafts 136 136^a, the former extending entirely across the machine and the latter to a point just beyond the middle line, as clearly indicated in Fig. 7. These shafts are supported in suitable bearings depending from the bars 39 39 and from the base of the middle folder 42, so that they can oscillate slightly. The shaft 136 carries under plate 44 two rods 137 137, the ends 138 138 of which are bent upward at right angles, so that their points are held just below holes 139 139 in the plate 44. The shaft 136^a also carries similar rods 137 137, the points of whose ends are held under the holes 139 139 in the other plate 44. On the end of shaft 136 is a downward-projecting arm 140, and on the shaft 136^a is a similar arm 140^a. Each of these arms is connected with the ends of springs 141 141^a. The two arms 140 140^a are held between pins on opposite sides of a bar 142, this bar being pivoted to the catch-bar 124.

The operation of the above-described mechanism is as follows: When the machine is in action, the point of the handle-arm is held under the hook of the catch-bar 124, whereby the spring-bar 122 is forced down and the spring retracted, and the rod 89 is in the position where the points of the set-screws 87 rest in the slots 88, and the gumming-disks rotate in contact with the seams of the blanks as they are carried by on the cylinder. The paper as it passes through the folders travels under the plates 44 44 and bearing upon the points of the rods 137 holds the same down, as shown in Fig. 8. So long as the paper travels under the plates 44 its strength is sufficient to hold the points of the rods 137 down; but if a

break occurs in the paper, either by its tearing off at a point forward of the carrying-cylinder, or because it is not continuous, whereby the carrying-cylinder will cease to draw the paper through the folders, the pressure of the paper upon the points of the rods 137 will be removed and they will be thrown up through the holes in the plates by the action of the springs 141 141^a on the projections 140 140^a, whereby the shafts will be rotated sufficiently to draw the bar 142 forward slightly, whereby the catch-bar 124 is pulled back and caused to release the point of the arm 89^a, whereupon the spring-bar 122 throws the arm 89^a up to a perpendicular position, as shown in Fig. 8, and the rod 89 is turned on its axis, and the set-screws 87 being shifted to the round of the bar lift the gumming-disks out of contact with the carrying-cylinder. By the same movement of the arm 89^a the rod 135 is drawn backward, and thereby the yoke 133 is caused to slide the crank-pin 132 before the cam 134^a, so that before the shaft makes one entire revolution the face of the cam is brought to bear against the pin and turns the crank-arm 131, and with it the rod 128, whereupon the belt is shifted and the machine stopped.

A preferred mechanism for folding the blank and delivering the completed bag is shown in Figs. 3^c and 3^d, Sheet IV. In this arrangement the folding-roll 93 consists of two disks 143 143, (with hubs for the shaft,) which are united by transverse plates 144 144, let in their peripheries and properly secured. In proximity to these plates there are grippers 145 145 connected with the roll and having cranks 146 146, which are arranged to be opened and closed in the usual manner. Presser-rolls 147 148 are arranged to bear against the folding-roll on one side, and below is the delivery-roll 95. The folding-roll in this construction is of the same size as the carrying-cylinder. Hence it is adapted to fold two blanks at each revolution, two grippers being provided, as described. In the operation of this mechanism, after the forward part of the blank has been thrown back over the folding-roll and the grippers have carried the bottom end of the bag past the bite between the carrying-cylinder and folding-roll, the carrier grippers release the bottom of the bag, and the grippers 145 just beyond the bite catch the bottom, and thus carry the bag with it in its further rotation, and as the bag passes the bite the peripheries of the disks 143 143 press the two parts of the bag together on the seams against the carrying-cylinder. The folded bottom is held on the plate 144, and when it reaches the pressing-rolls 147 148 these press the folded edge of the bottom perfectly flat. The grippers hold the bag until its bottom edge is caught between the folding-roll and delivery-roll 95, when they release it, and the bag is delivered and falls upon the pins of the collector 106 below, as heretofore described. As

shown and described, the four corners of the part F of the blank on the carrying-cylinders are arranged to be caught and held by the grippers; but it is obvious that the forward corners only may be held, and the rearmost pair of each set of grippers may thus be dispensed with. Wherever the paper is shown passing through the machine it is designated by the letter P.

10 I claim—

1. In a bag-machine the combination with suitable cutting creasing and seam-folding mechanism of a plurality of rotary carriers, a plurality of laterally and vertically operated grippers mounted upon parallel reciprocating and vertically-movable bars connected with the rotary carriers, and stationary cams for giving the two motions to the bars and grippers, substantially as specified.

2. In a bag-machine the combination of a rotary blank-carrier having a pair of grippers for gripping the forward corners of the seamed part of the blank, a cutting-off cylinder provided with a notched cutter-blade, arranged to coact with grooves in the blank-carrier, to partly sever the blank in the cylinder from the blank immediately behind it, and spring-pins in the cutting-cylinder to catch the end of the following blank and hold it against the carrier until caught by the grippers, substantially as specified.

3. In a bag-machine the combination of a rotary blank-carrier having a set of two pairs of laterally and vertically operated grippers for gripping the four corners of the seamed sides of the blank, a cutting-off cylinder provided with a notched cutting-blade to partly sever the blank on the cylinder from the blank immediately behind it, and spring-pins on the cutting-off cylinder for catching the end of the following blank and holding it until caught by the grippers, substantially as specified.

4. In a bag-machine the combination of a printing attachment, cutting and creasing mechanism to cut out the side seams of the blank and form the creased-bottom-folding line, folders for folding over the side seams against the part of the blank to which they are attached, a rotary carrying-cylinder having grippers in pairs, for gripping the corners of the seamed part of the blank to hold the blank while being cut off, gummed and folded, and a cylinder coacting with the rotary carrying-cylinder and provided with a notched knife for partly severing the blank on the cylinder from the following blank and spring-pins for holding the end of the following blank until caught by the grippers, substantially as specified.

5. In a bag-machine the combination of cutting and creasing mechanism to cut out the side seams of the blank and form the creased-bottom-folding line, folders for folding over the side seams on the part of the blank to which they are attached, a carrying-cylinder provided with grooves that coact with the cut-

ting-off blade, and grippers for gripping the blank to hold it while being cut off, gummed and folded, a cutting-off cylinder having a cutting-blade constructed to partly sever the following blank from the preceding blank, and fingers, and mechanism for operating the same, arranged to be thrust through holes in the cylinder against the part of the blank in advance for the purpose of breaking the remaining connections between the forward end of that part of the blank and the rear end of the preceding blank, substantially as specified.

6. In a bag-machine the combination of a carrying-cylinder provided with grippers for gripping the seamed part of the blank to the cylinder, suitable gumming mechanism, fingers for throwing the forward end of the blank off the cylinder and over to the back of the folding-cylinder, a suitable folding-cylinder, a delivery cylinder or roll coacting with the folding-cylinder to deliver the completed bag, a revolving collector divided by pins into compartments, located behind the delivery-cylinder, a trough at the lower end of which the said collector is placed so that its pins will pass between the sides of the trough, and suitable mechanism for operating the said collector whereby when the proper number of bags have been deposited in one of its compartments, the collector is turned to carry the filled compartment out of the trough and bring an empty one in place to receive the bags, substantially as specified.

7. In a bag-machine the combination with the carrying-cylinder, folding-cylinder and delivery-cylinder, of a platform made of rods supported under the carrying-cylinder and with the ends of the rods projecting between the folding and delivery cylinders, plates on each side of the said platform, and fingers projecting up between the rods forming the platform and mechanism for vibrating the said fingers, whereby when the completed bags fall upon the platform, the said fingers thrust them back between the carrying-cylinder and the delivery-cylinder to adapt them to be caught between the said cylinders and delivered by them into the collector, substantially as specified.

8. In a bag-machine the combination with a revolving compartmented collector of a ratchet-wheel 105 on its shaft, a pawl 104 for operating the same, connected with an arm or lever 103 a cam for operating the said arm or lever, a link 108 connecting the pawl, with a spring-controlled arm 109 a ratchet-wheel 111 the teeth which correspond in number with the number of bags it is intended shall make a bundle, one of the said teeth being longer than the other, a pawl 110 also connected with the arm 103 and a set-screw 112 on the arm 109 the point of which bears against the shank of pawl 110, and thus holds the pawl 104 out of engagement with the ratchet-wheel 105 until the pawl reaches the longer tooth of the ratchet-wheel 111 where-

upon the pawl 110 moves farther toward the center of the ratchet-wheel thereby allowing the arm 109 to be drawn back by the spring, and the pawl 104 to move against the ratchet and engage one of the teeth, so that when the cam lifts the arm or lever 103 the said pawl turns the ratchet and moves the filled compartment of the collector out of the trough and brings an empty one into position to receive the bags, substantially as specified.

9. In a bag-machine the combination with a printing mechanism for printing the blanks and a carrying-cylinder for carrying the printed blanks to the gumming, folding and delivery mechanism, of a cleansing-cylinder, a trough for the cleansing fluid, a roller intermittently operated by a pawl for supplying the cleansing fluid to the cylinder, and means for rotating the cleansing-cylinder against the surface of the carrying-cylinder and in the opposite direction thereto for the purpose of removing the "offset" from the surface of the carrying-cylinder, substantially as specified.

10. In a bag-machine the combination of a blank-carrying cylinder, seam-folders having a folder-plate hung under the folder-flanges, gumming devices for applying gum to the seams of the blanks, means for throwing the gumming devices out of contact with the blank-carrier rods placed under the folder-plate with their points under the openings in the said plates and mechanism connecting the said rods with the means by which the gumming devices are placed out of contact with the blank-carrier, the construction being such that when the paper is passing under the folder-plate and over the points of the rods, the rods are held down and the gumming devices are retained in position to apply gum to the seams, but when no paper is passing under the plate the points are thrown up through the openings in the plate and through the connecting mechanism, cause the gumming devices to be moved away from the carrier-cylinder, substantially as specified.

11. The combination of a blank-carrying cylinder, flap-folders, a folder-plate hung under the flanges of the flap-folder, rods hung under the said plate and having their points under openings in the plate, a belt-shifter, a cam for operating the belt shifter, and mechanism supported between the rods under the folder-plate and the cam, whereby when no paper passes under the folder-plate, the points of the fingers are thrown up through the openings in the said plate and thereby through the interposed mechanism they cause the belt-shifter to shift the belt from the fast to the loose pulley and stop the machine, substantially as specified.

12. The combination in a bag-machine of a printing attachment to print from a web of paper, an adjustable splitting device behind

the printing attachment to divide the paper into two parts, and two sets of cutting and creasing mechanism mounted on the same shafts, consisting of adjustable disks carrying transverse and semicircumferential cutting-blades and creasing-blades so arranged with respect to each other that two blanks of equal or unequal width can be simultaneously formed substantially as specified.

13. The combination in a bag-machine of a printing attachment to print from a web of paper, cutting and creasing mechanism to form the blanks for the bags, folders for turning the side seams over on the part of the blank to which they are attached, a rotary carrying-cylinder provided with sets of grippers to hold the corners of the blanks, cutting-off mechanism coacting with the carrying-cylinder to partly sever the blank on the cylinder from the following blank, and a gumming device for applying gum to the side seams of the blank, adapted to be thrown out of their gumming position automatically, to avoid putting the gum on the cylinder, substantially as specified.

14. The combination in a bag-machine of a rotary carrying-cylinder, grippers for holding the blank on the cylinder, parallel bars to which said grippers are attached that rotate with the cylinder, cams at the ends of the cylinder that coact upon the ends of the bars to give them a sliding motion in opposite directions to carry the points of the grippers over and away from the ends of the cylinders and cams and springs for moving the points of the grippers from and toward the surface of the cylinder, substantially as specified.

15. The combination in a bag-machine of a carrying-cylinder, sets of grippers for gripping the blank at the corners, fingers hung on rods inside of the cylinder, cranks on the rods, openings in the cylinder for the fingers to move through, cams to actuate the cranks to throw the fingers through the said openings, and springs for drawing them back within the cylinder substantially as specified.

16. In a bag-machine, the combination with a carrying-cylinder having sets of grippers for gripping the blank at the corners, and fingers for throwing the part of the blank in advance off the cylinder when released by its grippers, of a folding and pressing roll, which presses the part of the blank thrown off the carrying-cylinder against the seams and thereby folds the blank and causes the adhesion of the two parts together to form the bag, substantially as specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

MATTHEW VIERENGEL.

Witnesses:

FREDK. HAYNES,
CHAS. E. PETERS.