5 Sheets—Sheet 1.

J. P. RAYMOND.

PAPER BAG MACHINE.

No. 190,618. Patented May 8, 1877.

Fig. 1

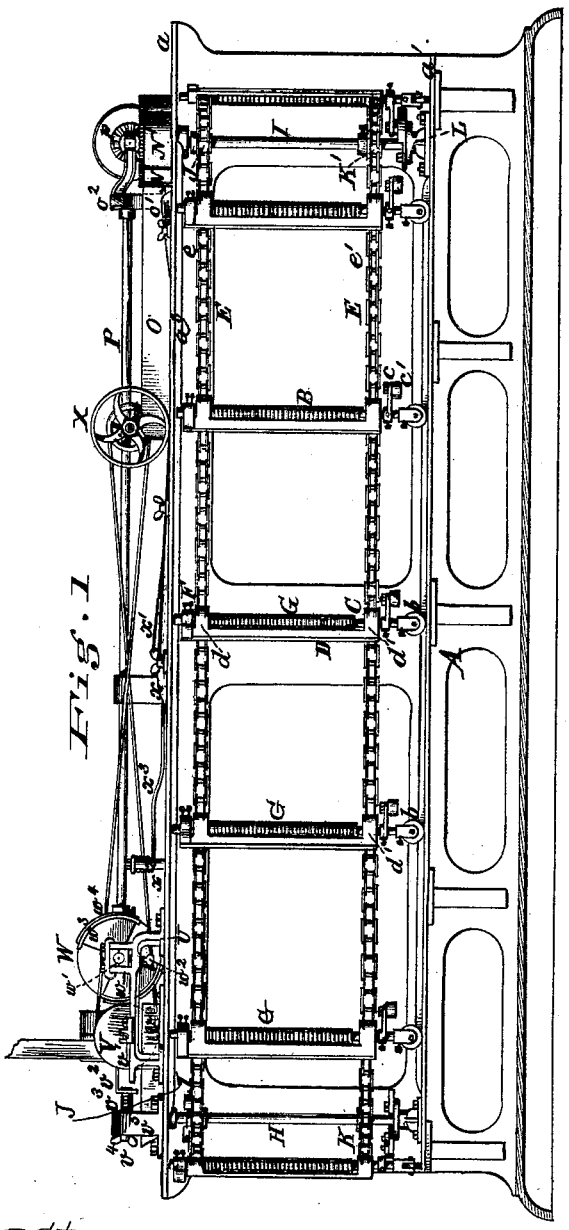


Fig. 3

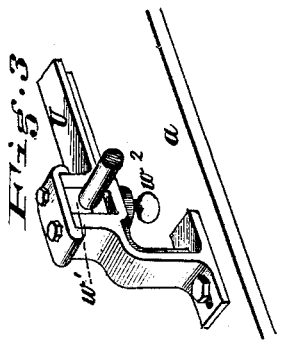
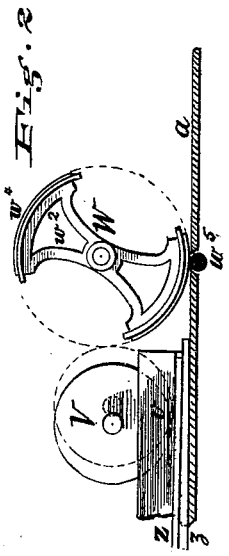


Fig. 2



Attest

Edgar J. Gross.

John. E. Jones.

Inventor.

James P. Raymond

by Edw. J. Gibbs

Atty

5 Sheets—Sheet 2.

J. P. RAYMOND.

PAPER BAG MACHINE.

No. 190,618. Patented May 8, 1877.

Fig. 4.

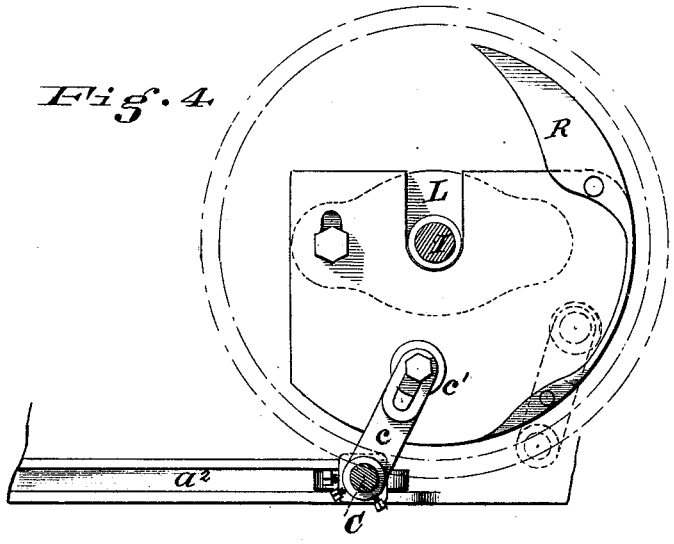


Fig. 5.

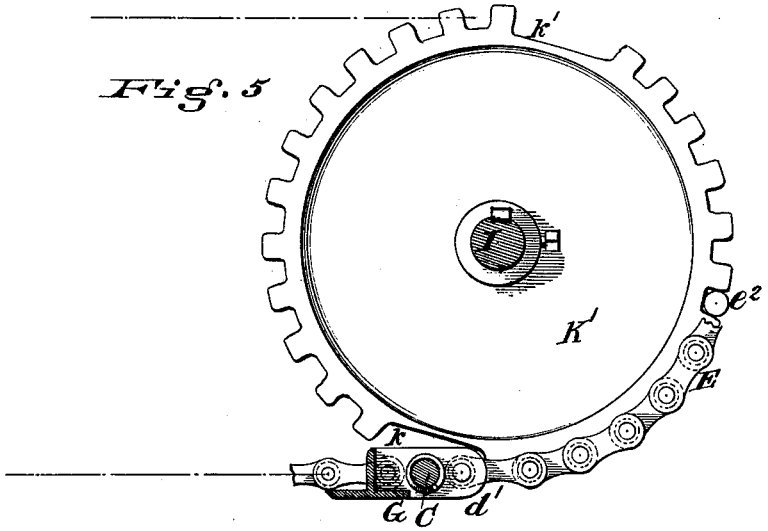
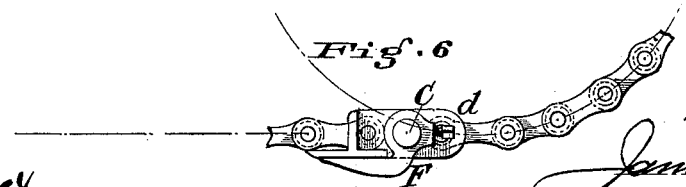


Fig. 6.



Witnesses:
Edgar J. Gross.
John E. Jones.

Inventor
James P. Raymond
by Edw. J. Eibs
Atty

5 Sheets—Sheet 3.

J. P. RAYMOND.

PAPER BAG MACHINE.

No. 190,618 Patented May 8, 1877.

Fig. 7

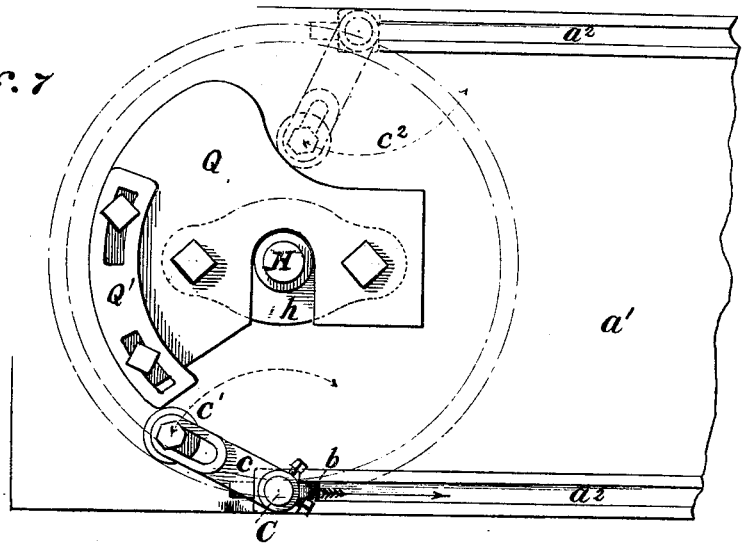


Fig. 8

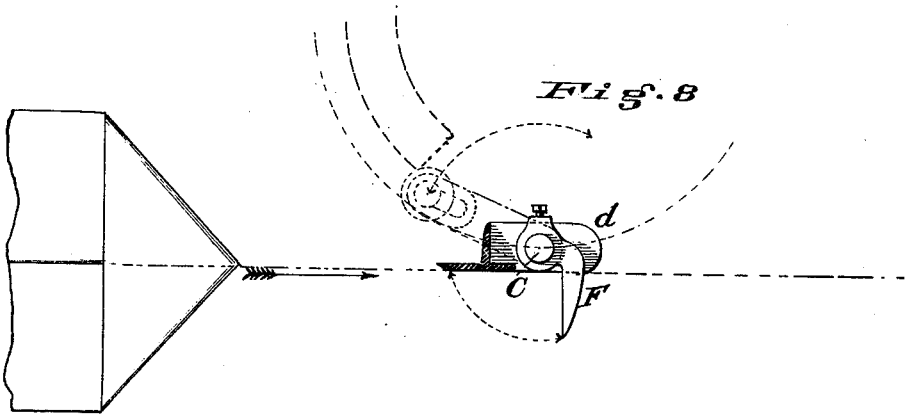
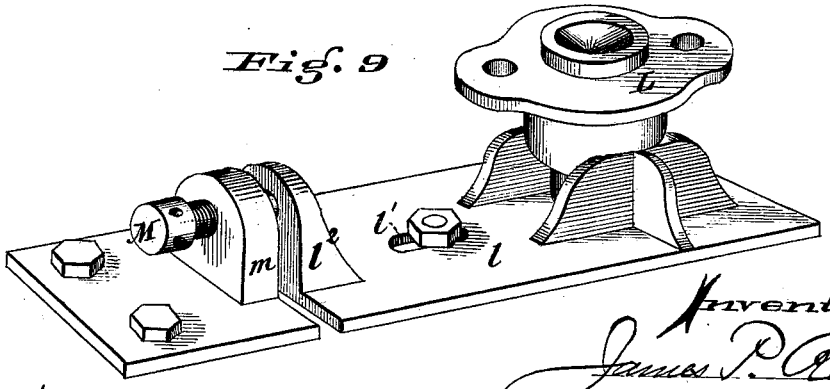


Fig. 9



Witnesses:
Edgar J. Gross.
John. E. Jones.

Inventor
James P. Raymond
by Edw. J. Eils
Atty

5 Sheets—Sheet 4.

J. P. RAYMOND.

PAPER BAG MACHINE.

No. 190,618. Patented May 8, 1877.

Fig. 10

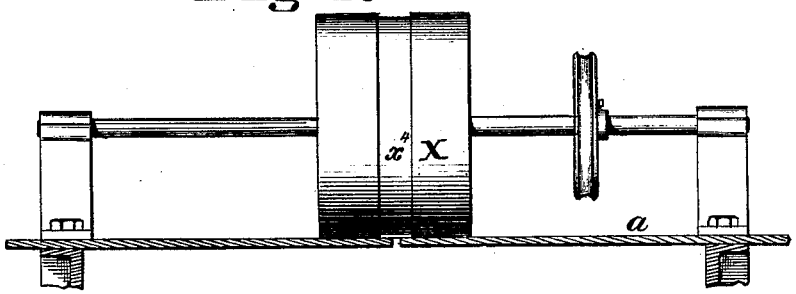
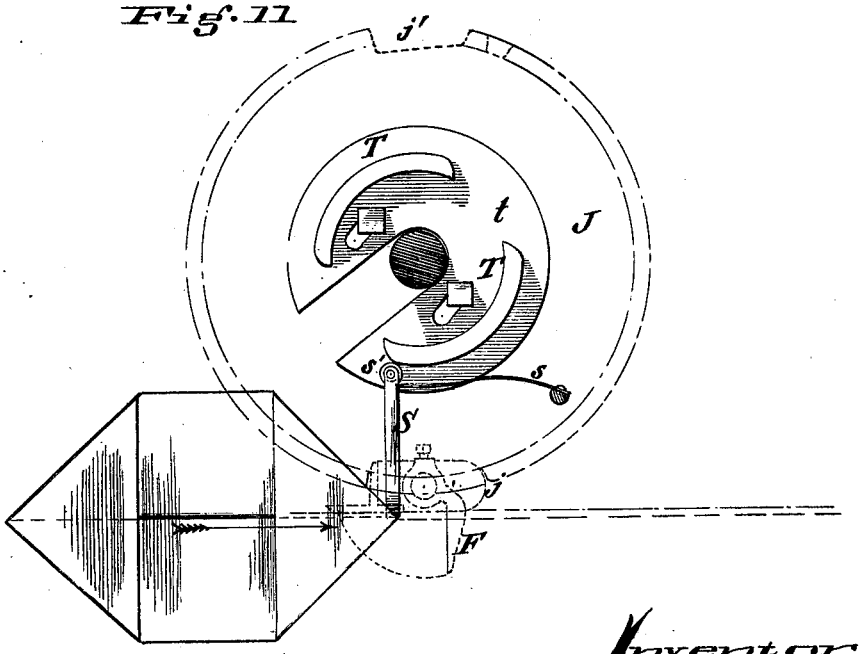


Fig. 11



Witnesses:
Edgar J. Gross.
John E. Jones

Inventor
James P. Raymond
by Edw. J. Gibs
Atty

5 Sheets—Sheet 5.

J. P. RAYMOND.

PAPER BAG MACHINE.

No. 190,618. Patented May 8, 1877.

† 619.

Fig. 12

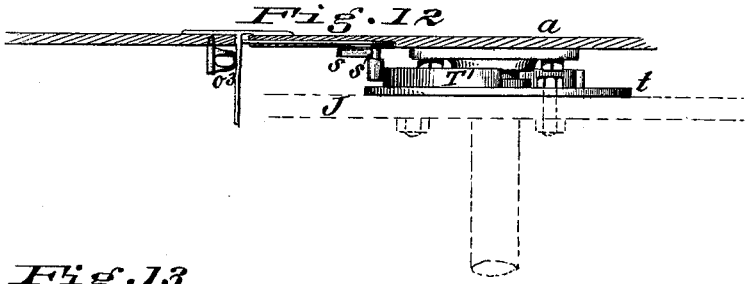


Fig. 13

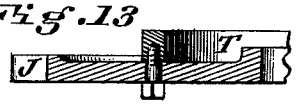


Fig. 14

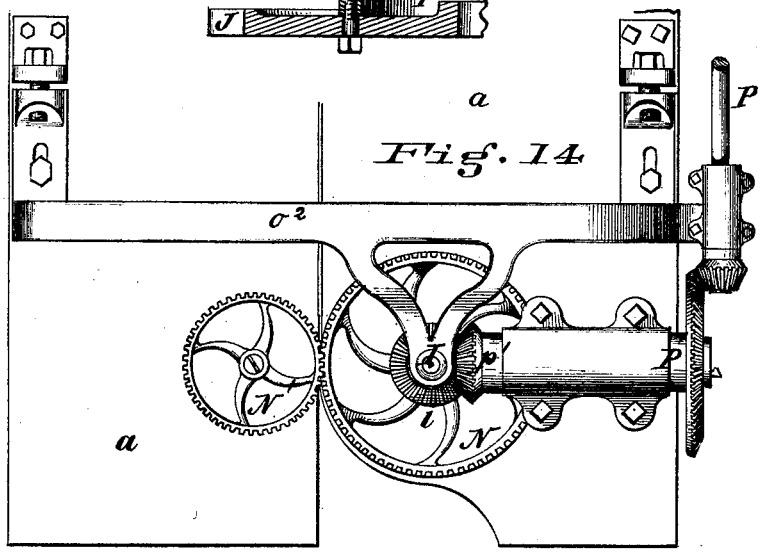
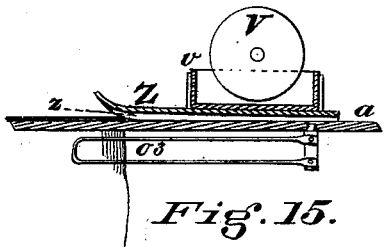


Fig. 15.



Inventor.

James P. Raymond

by Edgar J. Gross

Atty

Attest

Edgar J. Gross

John F. Jones.

UNITED STATES PATENT OFFICE.

JAMES P. RAYMOND, OF CINCINNATI, OHIO.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **190,618**, dated May 8, 1877; application filed December 16, 1875.

To all whom it may concern:

Be it known that I, JAMES P. RAYMOND, of Cincinnati, Hamilton county, and State of Ohio, have invented an Improvement in Paper-Bag Machines, of which the following is a specification:

My invention relates to a class of paper-bag machines in which the blank to be operated upon is carried, by a traveling-belt, entirely through the machine and all its operations.

The principal element of my invention, which relates more especially to machines employed in the manufacture of satchel-bottom paper bags, consists of a griper chain or belt, adapted to seize the blanks by means of its nippers, and draw it forcibly through the machine, during which passage the blank may be subjected to any one or to all of the operations which the blank has to undergo to convert it into a bag.

The other elements may be briefly enumerated as follows: A table, or equivalent supporting means, for supporting the blank at the points where it is subjected to pressure; pasting devices for applying paste to the blank at the proper points; means for folding the side laps for the bottom of the bags; rollers for pressing the bottom flaps of the bag after they have been pasted and folded; a clamping device for holding the blank until taken by the griper belt or chain.

My invention consists of certain combinations of these elements, as specifically pointed out by the claims at the conclusion of this specification.

Referring to the accompanying drawings, Figure 1 is a side elevation of my improved machine, showing the frame partly in section. Fig. 2 is a side elevation of the pasting device. Fig. 3 is a perspective view, showing the style of adjustable bearing used for the pasting-roll shaft. Fig. 4 is a plan view, showing the devices which act to open the nippers, and relieve the bag when finished. Fig. 5 is a plan view of gear-wheel and section of chain and nipper post or frame. Fig. 6 is a section of chain, showing the nipper and frame. Fig. 7 is a plan view of the devices which operate the nippers at the front end of the machine. Fig. 8 is a diagram, showing action of nippers and tripping-lever, and the path of the bag when fed to the nippers. Fig. 9 is a perspective view, showing the lower and adjustable step for the gear-shaft, by which the nipper belt or chain may be tightened. Fig. 10 is an elevation of pressure-roller, showing cross-section of table and frame. Fig. 11 is a diagram, showing the operating-cams and feed-plate, also the manner in which the nipper takes hold of the bag. Fig. 12 is an elevation of feed-plate and operating-cams, showing the table in cross-section. Fig. 13 is a sectional view, showing one manner in which the cams can be secured to the gear-wheel. Fig. 14 is a plan view of the end of the machine at which the bag leaves it, showing delivering-rolls and adjustable frame, &c. Fig. 15 is a sectional elevation, showing spring presser-foot, for properly guiding the bag-blank, and the presser-plate for holding down the flaps of the bottom.

A is the frame of the machine, fitted with an upper table, *a*, slotted through the center its entire length, and a lower table, *a'*, which extends only about half the width of the machine, and is suitably supported to sustain the weight of the traveling-belt or chain B, and its motive attachments. The chain B is made up of a series of vertical frame-posts, C, whose lower ends are provided with suitable casters *b*, calculated to travel in guideways on the table *a'*, upon which posts are swung the nipper-frames D, that connect one with another at the flanges *d* near the top, and the flanges *d'* near the bottom, by means of a double system of chains, E; and these parts, in connection with the nippers F, which are attached adjustably by means of set-screws to the upper ends of posts C, and the coiled springs G, which are wrapped around with one end secured to the posts, and the other to the frame D, thereby causing a strain between them, which will cause the said nippers to forcibly hug the surface of the frames D, constitute the nipper-chain, as seen in elevation in Fig. 1, with the addition of a tripping-lever, *e*, having adjustable friction-roller *e'*. As seen in Fig. 7, there are formed upon the table *a'* guideways or tracks *a''* for the casters *b* of the posts C to travel in, which tracks are duplicated on the under side of

table *a*, at *a'''*, for the tops of the posts to travel in. (See Fig. 1.)

The above-described belt is extended between two sets of gear-wheels secured upon upright shafts H I, having suitable steppings upon table *a'*, and bearing on the under side of table *a*. The set of gear-wheels marked J J' are secured upon the shafts H I, respectively, near the upper end, and exactly in line with the flanges *d* of the frames D, so that they may engage with the upper line *e* of chain E, attached to said flanges. The set of gear-wheels marked K K' are secured upon the shafts H I, respectively, near the lower end, and exactly in line with the flanges *d'* of the frames D, so that they may engage with the lower line *e'* of chain E, attached to said flanges.

One of the shafts, say I, is stepped in a box, L. (Shown in perspective in Fig. 9.) This box L is formed upon a slotted plate, *l*, fitted with slot l^1 and lug l^2.

When the plate *l* is secured upon table *a'*, by means of bolt and nut, through slot l^1, it can be adjusted back and forth by means of set-screw M in the stationary lug *m*, working upon lug l^2. By this means the shaft I can be moved to tighten the belt B, which, being of metal, will require but slight movement of the bearing-box L. From the fact that the flanges *d d'* of the nipper-frame D will have to pass around the periphery of the gear-wheels when the belt B is in motion, and they being of greater length and thickness than the pins *e''* of chain E, and not able to enter between the teeth of the wheel, I provide recesses *j j'* in the wheels J J', by cutting away a suitable number of teeth to a sufficient depth, into which these flanges may engage. In the present instance, the circumference of the gear-wheels passes an extent equal to the united distance between the centers of three consecutive nipper-posts, and consequently are provided with two of the above recesses exactly opposite each other. The gear-wheels K K' are provided, as above, with similar recesses *k k'*, for the accommodation of the flanges *d'*. The shaft I is projected up beyond the table *a*, and fitted with a drum, N, having teeth near its top to engage with the teeth of drum N' on the opposite side of the slot in the table. The shaft I (see Fig. 14) is also provided with bevel-gear wheel *i*, to engage with wheel *p'* of the horizontal shaft P', which latter connects, by bevel-gear, directly with the shaft P, running along the machine from end to end. The shaft P is provided with customary loose and tight pulleys, for applying power intermittently, and is the means of power for the entire machine.

The bag, in being formed, is drawn along the slot in the table *a* by the nippers F, and it is obvious that there must be some means of opening and closing them, to take hold of and release the bag, at the commencement and ending of the operation.

To accomplish this, I first secure upon the stepping-box *h* of shaft H, around said shaft, a cam-plate, Q, in such position (see Fig. 7) and of such construction that the rollers c^1 of tripping-arm *c*, when the post C and nipper-frame D are passing on toward and around the gear-wheels J K, will strike it and cause the arm to move backward, as indicated by dotted line c^2, Fig. 7, while the nipper will move accordingly, and retain this position until the nipper-post C has passed to the position shown in Fig. 8, after which a continuation of the movement will cause the roller c^1 to pass the utmost limit of the cam Q and swing around to its normal position, as shown by dotted lines in Figs. 7 and 8, carrying the nipper with it until the nipper hugs the surface of frame D; and to regulate the time of the closing of the nippers, I provide a slotted plate, Q', which can be secured to the cam Q adjustably by means of set-screws, so as to lessen or increase the extent of the cam at the point where the tripping-arm leaves it. Now, to provide for the opening of the nippers at the other end of the table, after the bag has passed all the operations and is ready to be released from the nippers, I provide a cam-plate, R, secured upon a plate, which I attach to the stepping-box L around shaft I, and which is so placed and constructed that it will, at the right moment, change the path of the roller c^1 of tripping-arm *c* to such an extent that the nipper F will be sufficiently thrown back to allow of the free disengagement with the bag being formed. Any of the nippers F not wanted for use may be prevented from operating by simply adjusting the tripping-lever *c* upon post C, so that it will not engage with above-mentioned cams. In Fig. 11 is shown, in plan, a feed-plate, S, which is fitted to slide in the under part of table *a* back and forth from the slot shown by dotted lines, by means of spring *s* pressing against the shank, which supports a friction-roller, *s'*. As seen in Fig. 12, the feed-plate S, by means of spring *s*, is kept positively away from the slot in the table *a*, except when forced to it by cams T T' revolving with wheel J; and, when thus pressed, it rests against the edge of the opposite part of table *a*, and would catch and gripe anything placed in the slot at this point of the table. In Figs. 11 and 12 the feed-plate is shown as griping a bag which hangs mouth downward in the slot, while the diamond fold lies upon table *a*. The diagram in Fig. 11 shows how the feed-plate holds the bag until the nipper F is ready to grasp it and carry it off.

The cams T T' are so adjusted upon wheel J that they will release the feed-plate at the instant that the nipper F takes hold. The said cams act directly upon friction-roller *s*, secured by a shank to the feed-plate S to move the feed-plate forward in the act of griping. The cams T T' are either formed upon a plate, *t*, as shown in Figs. 11 and 12, and secured by set-screws to the wheel J, or else, as shown in Fig. 13, secured directly to the wheel J.

It is obvious that the feed-plate S is required

to make or perform one operation for each nipper in operation; and, consequently, as each cam T or T′ causes the plate S to perform one of these operations, it is plain that the number of cams must equal the number of nippers in operation, which pass around wheel J in a single revolution.

The number of nippers in operation can be governed by the adjustable character of the tripping-arms *c*, as before described. I have thus far described the mechanism mostly beneath table *a*, for carrying the bag through the several operations of the machine. The bag, when first introduced to the machine, is a flattened tube, one of the ends of which is spread out in what is called a diamond fold. The bag thus folded is introduced to the machine with the diamond fold spread out upon the upper surface of table *a*, and the flattened tube extending down through the slot in the table. The feed-plate and nippers operate upon the tube to carry rhe bag through. Secured upon the table *a*, at the forward part of the machine, are frames U, which support a paste-distributing roll, V, and revolving paster W. The paste-roll V revolves in a paste-vat, *v*, which is elevated sufficiently above the table *a* to allow the bag to pass, and the position of the roll V upon frame U can be raised or adjusted by means of adjustable box v^1. The paste-box rests on or is secured to a pivoted plate, Z, provided with rails *z* at the bottom on either side, so as to keep it a little elevated above the table, and somewhat more so at the front end than at the rear end. At the front end this plate is curved up, as best seen in Fig. 15. It acts as a pressure-plate, to hold down the bottom flaps or diamond fold of the bag blank. To cause this roll to convey an even and moderate amount of paste from vat *v*, I provide scraper v^2, having spring-feed v^3, controlled by set-screw v^4 in frame w^5. The roller V is set in motion by a cross-belt from a pulley upon the shaft of pressure roll or rolls X, which latter connects directly with shaft P, by means of suitable bevel-gear, in such a manner as to feed, between it and the table *a*, in the direction of operation taken by the belt B, which also connects with shaft P, as before described.

The pasting device W is secured in box *w* on frame U in suitable boxing w^1, the position of which is regulated by means of thumb-screw w^2, from underneath.

The revolving paster W is run in the same direction as roller X, by means of gear-connection from the shaft P, and in its revolution comes in contact with periphery of roller V, which runs or rolls with it, by reason of cross-belt from shaft of rolls X, and supplies it with paste from the vat. The wing or wings w^3 of paster W, having pasting-surfaces w^4, which are arcs of a circle, revolve so as to hardly touch the surface of table *a*, but, as shown in Fig. 2, press against a couple of rubber rollers, w^5, situated in the table *a* on each side of the slot therein. These rollers may be, however, made elastic, by means other than rubber. For instance, a coiled-spring roller may be used, as the function of the rollers is to keep the leaves of the diamond fold of the bag close against the paster, and, should there be by accident no bag passing, to catch the paste from the paster, and thus obviate the smearing of the table with paste were the roller not used. The action of the paster is timed with the passage of the nippers F under it, carrying a bag-blank, and applies the paste to the diamond fold in a regular form. In the present instance, however, when every nipper is used to carry a bag, the paster has two wings, w^3, to catch the bags carried by two nippers past it while making one revolution, and if every other nipper only were used to carry bags it would be necessary only to use a paster having but one wing, w^3. In front of the rolls X are secured adjustably two folding-plates, *x x′*, which fold out of time, so as to lay one edge of the diamond fold over the other in completing the bottom of the bag.

Secured to frame x^2 are spring-fingers x^3, which keep the bag in position against table *a* while the edges are being turned up and over by plates *x* x^1, as the nipper-chain B draws the bag along. After the bag has passed the folders above described, it passes under the roll or rolls X, which serve to press the folded edges of the bag closely back on themselves, in completing the bottom, and, at the same time, by reason of recess or groove x^4 in the periphery of said roll or rolls, provide against the extreme pressure upon the bottom, where the turned-down edges overlap each other, forming an increase of thickness, that would force the paste from between the folds, and destroy the perfect manufacture of the bag.

Immediately following the above-mentioned rolls, and secured slightly above and in the direction of the slot in the table *a*, extending as far as the upright delivering-drums N N′, is a plate or guide, O, which serves to keep the bottom of the bag upon the table *a* while the "packing-fold" is being formed by folding-plates *o* o^1, preparatory to the bag entering the grasp of delivery-rolls N N′. The shaft of rolls X rests in adjustable bearings, like to that shown in Fig. 3, so that the amount of pressure to be applied to the bottom of the passing bag can be regulated according to the thickness of the material used. The bearing or box o^2, which receives the upper part of the shaft I, is adjustably secured upon table *a* in a manner similar to that in which the box L is secured upon table *a′*, so as to be able to with it in accurately straining the belt B.

The operations to which the bag is subjected in the above-described machine are as follows:

The bag, as before described, is introduced to the feed-plate of the machine with the first or "diamond fold" of the bottom spread out upon table *a*, and the flattened tube extending downward in the slot of said table. From

this position it is caught and drawn by nipper-chain B, as described, along the slot of the table, passing spring presser-finger o^3, which prevents buckling, and the diamond fold, held down by the presser-plate Z to near the point where it is to be pasted, on progressing receives the paste from paster W, after which it passes under fingers x^3, and the edges of the fold are turned over by folders x x^1, and pressed by rolls X; thence the bag passes under plate O, being carried by chain B, and is folded up against it by means of folders o o^1. The bag then enters the grasp of delivery-drums N N′, where the packing-fold is pressed to a permanent form, and delivered from the machine in a condition ready for packing.

It must, however, be understood that the said delivery-drums have not their entire hold upon the bag in delivering it, for the tripping-cam R is so constructed and situated that it will not loosen the hold of the nipper F upon the bag until the latter has passed almost, if not entirely, through the grasp of the drums, and it is evident that the bag will take a circular course as the nipper passes around gears J′ K′.

I have illustrated and described my invention as applied to a machine for making satchel-bottom paper bags, such as described in my United States Letters Patent, No. 145,125, the principal change being the substitution of the griper belt or chain for the two smooth endless feed-belts there used.

A machine organised as shown in that patent requires a slotted table, by reason of the vertical disposition of the feed belt or chain, and its arrangement under the table. I desire it to be distinctly understood, however, that my invention is not limited to this special arrangement of the griper belt or chain with reference to the table or other supporting means, and the pasting, folding, and pressing mechanisms. And I would have it especially understood that I do not confine myself to the use of a slotted table, because, under a different disposition of the griper-chain, the slotted feature might readily be dispensed with; and, besides, equivalent supporting devices might readily be substituted for the table.

It may be proper to state at this point that the use of an endless belt for feeding blanks in a paper-bag machine has heretofore been proposed; but in that case the belt was arranged to push the blank along, a method of feeding which would be wholly impracticable in a machine of the character described by me.

The belt did not possess the characteristics of a griper-belt, which draws the blank after it, nor was it combined in a way at all equivalent to that hereinbefore set forth.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for making paper bags, the combination, substantially as specified, of the griper-belt for feeding the blank, and the table, or its equivalent, for supporting the blank while operated upon.

2. The combination, in a machine for making satchel-bottom bags, of the griper belt or chain, and the pasting devices, operating substantially as and for the purpose specified.

3. The combination, in a machine for making satchel-bottom bags, of the griper-chain or griper-belt for carrying the blank tube, and the folding mechanism for folding the side laps for the bottom of the bag, substantially as and for the purpose specified.

4. The combination, in a machine for making satchel-bottom bags, of the griper-chain or griper-belt for grasping and feeding the blank, and the pressure-roller for pressing the bottom flaps of the bag after they have been fastened and folded.

5. The combination, in a machine for making satchel-bottom bags, of the griper-chain or griper-belt for carrying the blank through the machine, and the folders, by which the bottom flaps, after pasting, folding, and pressing, are folded together for passage through the discharge-rollers.

6. The combination, substantially as specified, of the slotted table and the reciprocating plate, for confining and holding the blank until griped by a nipper on the endless feed-belt.

7. The combination, substantially as specified, of the paster, the table, and the yielding pressure-rollers, located in transverse slots in the table.

8. The combination, substantially as specified, of the drums for discharging the completed bag, the nipper, and the cam for opening the nipper.

In testimony of which invention I hereunto set my hand.

JAMES P. RAYMOND.

Witnesses:
BENJ. SEBASTIAN, Jr.,
W. MAFFETT.