

(No Model.)

5 Sheets—Sheet 1.

W. LIDDELL.
PAPER BAG MACHINE.

No. 455,407.

Patented July 7, 1891.

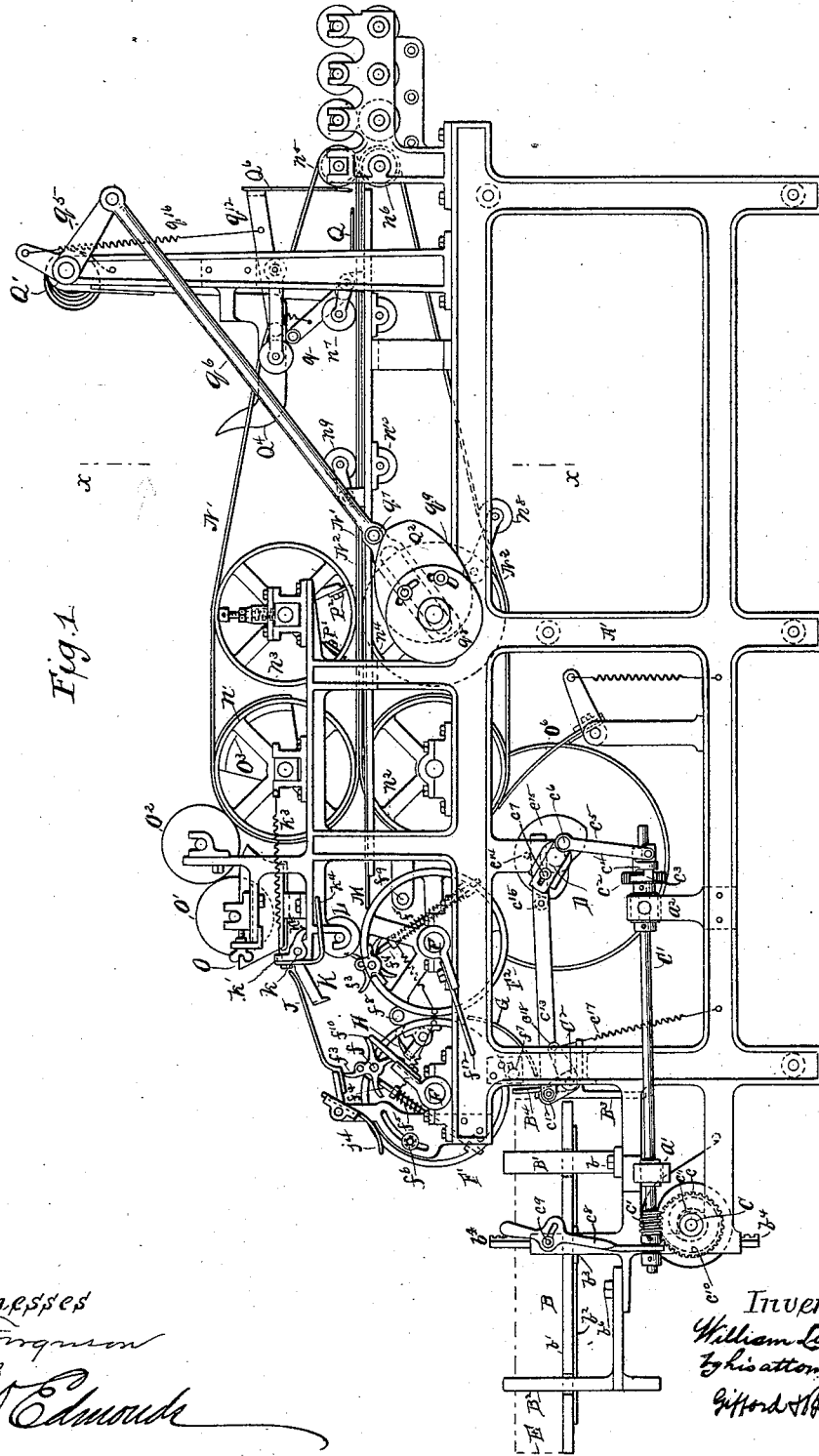


Fig. 1.

Witnesses
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Gifford Brown

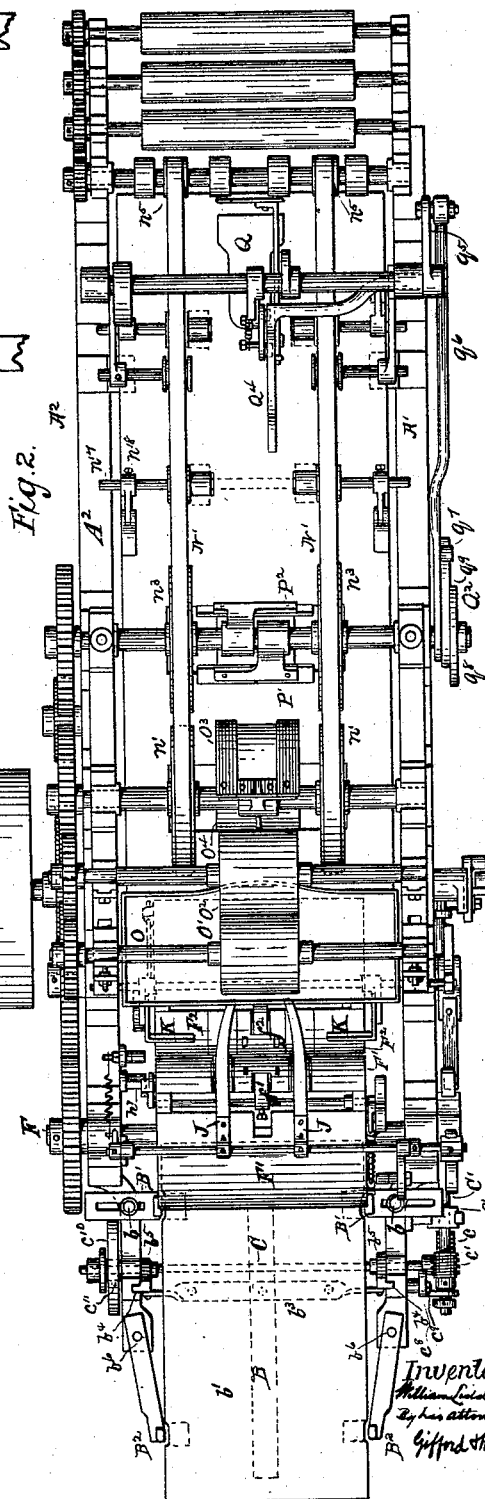
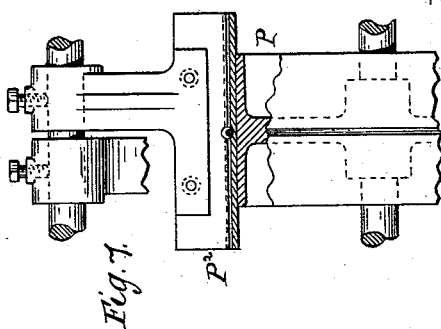
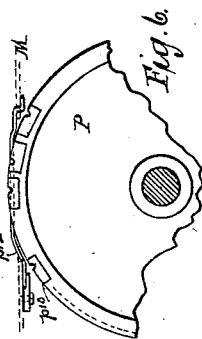
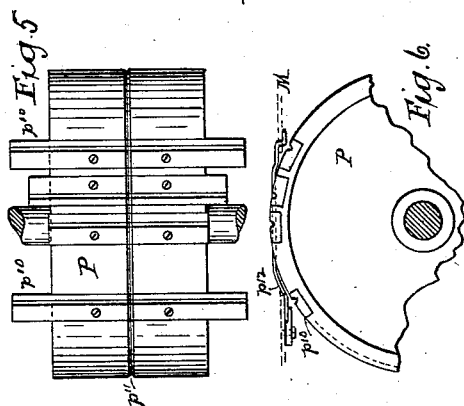
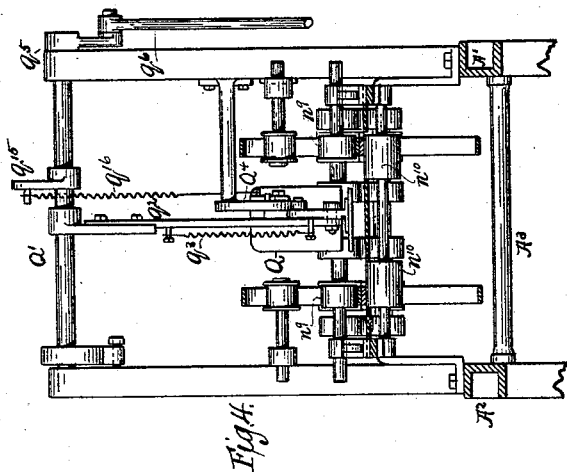
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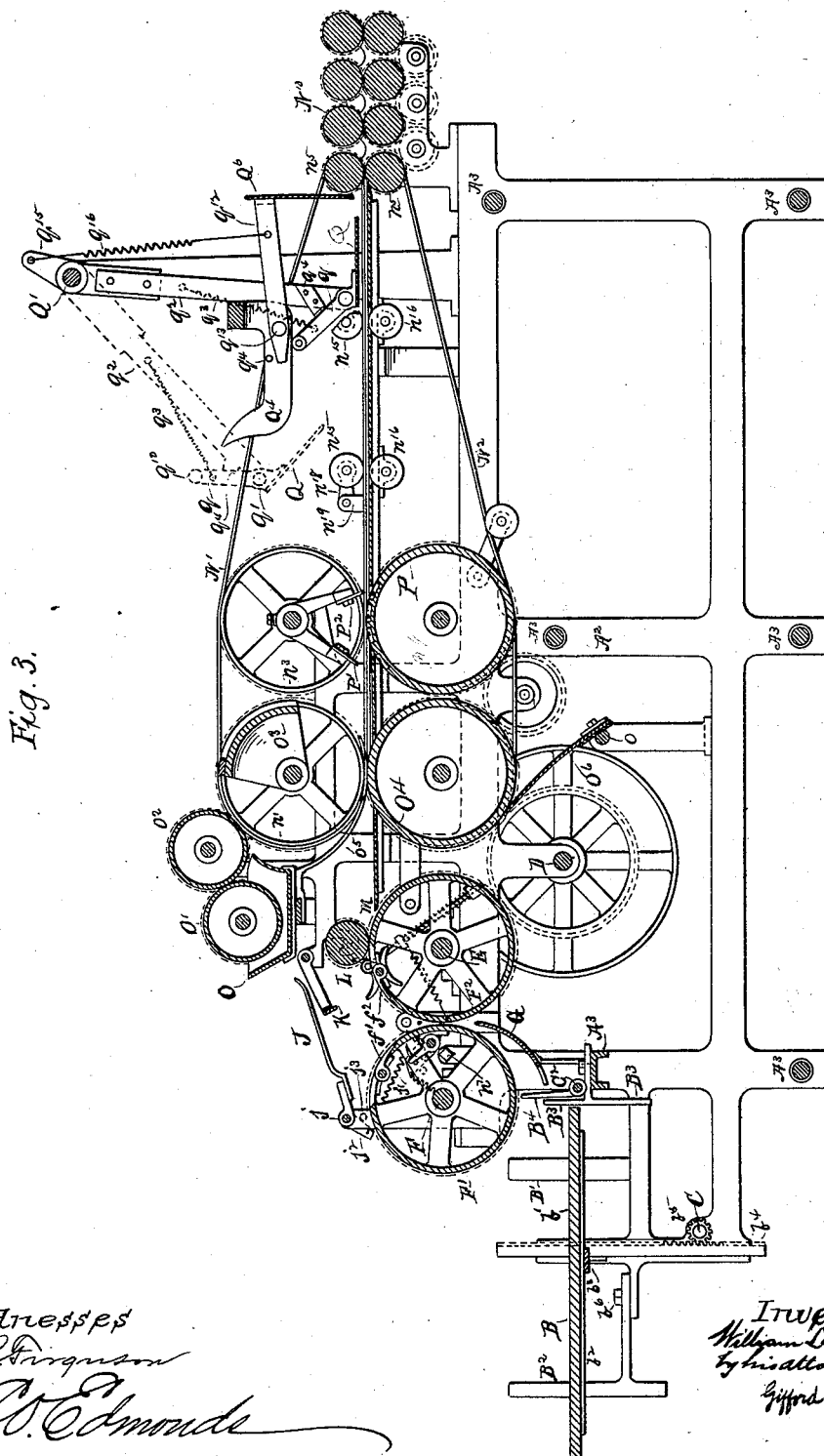
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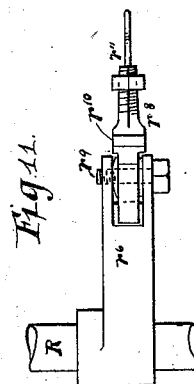
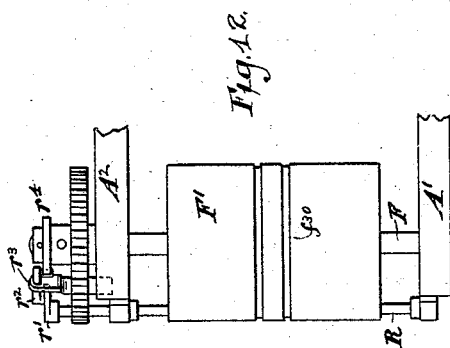
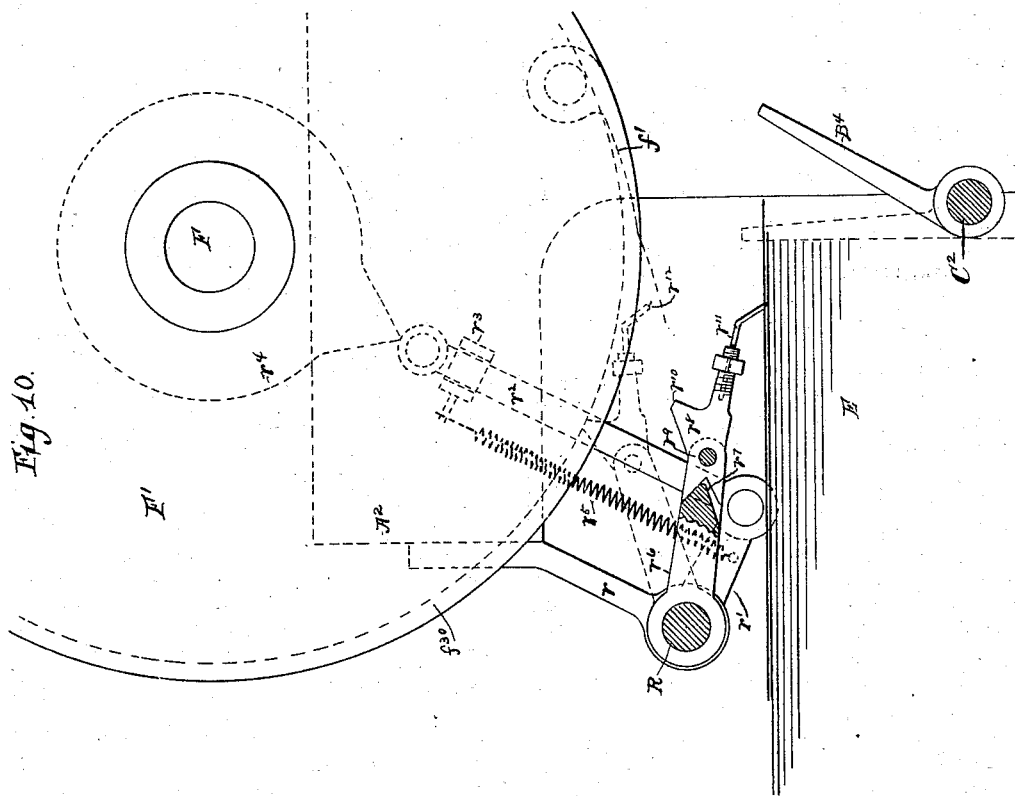
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WITNESSES

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UNITED STATES PATENT OFFICE.

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DAVID S. WALTON, OF EAST ORANGE, NEW JERSEY.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,407, dated July 7, 1891.

Application filed December 30, 1889. Serial No. 335,346. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LIDDELL, of Brooklyn, in Kings county and the State of New York, have invented a certain new and useful Improvement in Paper-Bag Machines, of which the following is a specification.

My improvement relates to machinery employed for making what are commonly termed "satchel-bottom paper bags;" and it consists in various combinations of parts for shaping and pasting the bottoms of such bags. I will describe a machine embodying these combinations, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a side view of a machine embodying my improvement. Fig. 2 is a plan or top view of the same. Fig. 3 is a central longitudinal section. Fig. 4 is a transverse vertical section taken at the plane of the dotted line xx , Fig. 1. Fig. 5 is a plan of certain creasing devices on an enlarged scale. Fig. 6 is a side elevation of the same on the same scale as Fig. 5. Fig. 7 is a sectional elevation taken transversely of the machine on the same scale as Figs. 5 and 6, and illustrating some of the same parts and certain others operating therewith. Fig. 8 is an enlarged vertical section of one of two gripping-cylinders by which the bags whose bottoms are to be formed are fed into the machine, the section being taken longitudinally of the machine and centrally through such gripping-cylinder. Fig. 9 is a section on the same scale as Fig. 8 of the same cylinder, taken at the plane of the dotted line yy , Fig. 8. Fig. 10 is an enlarged end view of the same gripping-cylinder, having mechanism of modified construction combined with it. Fig. 11 is a top view of certain of the parts shown in Fig. 10 in connection with said gripping-cylinder. Fig. 12 is a top view, on a smaller scale, of the same gripping-cylinder. Fig. 13 is a top view of a pile of bag-blanks whose bottoms are to be formed in the machine and certain guides. Fig. 14 is a vertical section of the gripping-cylinders and their appurtenances, also a bag-blank, the section being taken longitudinally of the machine and serving to illustrate the first stage in the treatment of the bag-blank. Figs. 15, 16, and 17 are plan views of different parts of

the machine and bags illustrating different stages in the formation of the bottoms of the bags. Fig. 18 is a sectional side view illustrative of the final stage in the formation of a bag-bottom. Fig. 19 is a top view of a completed bag as it leaves the machine.

Similar letters of reference designate corresponding parts in all the figures.

The machine may have any suitable framing—as, for instance, two side frames $A' A^2$, connected by cross-bars or stretchers A^3 .

B designates a platform upon which the bag-blanks are supported before they are fed forward and acted upon in the operation of forming their bottoms. As shown, it consists of a board b' , having fastened to its under side two bars $b^2 b^3$, the latter of which extends crosswise and the former lengthwise of the machine. Near the ends the bar b^3 is twisted around, so that at the extremities its faces will be in vertical planes, and to these bent ends are secured upright rack-bars b^4 , which slide vertically in uprights formed on the side frames $A' A^2$ and engage with pinions b^5 , affixed to a shaft C . By turning the shaft C the pinions may be made to elevate or lower the platform. I have shown the shaft C as having secured to it a worm-wheel c , that meshes with a worm c' , mounted on a shaft C' , extending lengthwise of the machine and supported in bearings $a' a^2$, which are secured to the side frame A' . The shaft C' is driven from a shaft D , extending crosswise of the machine, through a pawl c^3 and ratchet c^2 . The ratchet c^2 is secured to the shaft C' and the pawl c^3 is carried by a swinging arm c^4 , which is mounted loosely on the shaft C' and oscillated by a link c^5 , that is put in motion by a crank c^6 on the shaft D . This crank consists of a wrist fastened to a plate which is adjustable diametrically on the shaft C within a grooved head that is fastened to one end of the shaft, said plate being fastened in any desired position by means of a screw c^7 , passing through a longitudinal slot in said plate and engaging with a tapped hole in said head.

The bearing a' consists of a bracket open on the top and a flanged box fitting within the same, so as to be incapable of independent movement lengthwise of the machine, but sus-

ceptible of movement upwardly and downwardly within the bracket. The bearing a^2 is pivotally connected with a supporting-bracket. Owing to this construction of the bearings the shaft C' may be oscillated so as to raise and lower the worm c' out of engagement or into engagement with the worm-wheel c . Provision for this is made by passing that end of the shaft C' near which the worm-wheel is arranged through a hanger c^8 , that is provided with an inclined or curved slot fitting a stud c^9 , which is secured to the side frame A' . By moving the upper end of this hanger in one direction the inclined slot will act upon the stud so as to raise the worm, and by moving it in the other direction it will lower the worm.

It will readily be understood that by the combination of parts which I have described the shaft D may be made to raise the platform B at the will of the operator to present the uppermost bag-blank of the pile on the platform into proper position to be fed into the machine, and that the adjustable connection of the crank c^6 with the shaft D affords provision for organizing the platform-elevating mechanism to render its movements suitable for bag-blanks of different thicknesses.

Combined with the shaft C , which rotates with the movement of the platform, is a volute spring c^{10} , that is secured at one end to a collar c^{11} , fastened to said shaft, and at the other end to the side frame A^2 . When the platform is lowered, this spring will be coiled up around the shaft C , and when the platform is loaded with bag-blanks the spring tends to counterbalance the platform and the bag-blanks. As the bag-blanks are fed off the platform, the weight of the pile of bag-blanks is reduced, but as the platform is raised after each bag-blank leaves the pile the spring is periodically uncoiled to a slight extent and to that extent becomes weaker. Hence it will weaken as the weight imposed upon the platform becomes less and still serve as a counter-balance for the load.

The collar c^{11} may be so shaped as that a wrench or key may be engaged with it and revolved by hand to change the vertical adjustment of the platform.

B' B^2 are guides secured to the side frames A' A^2 and extending upwardly adjacent to the sides of the platform B to preserve the bag-blanks piled upon the platform in proper order, precluding any lateral displacement thereof. As shown, there are notches in the sides of the platform opposite these guides. These notches are simply to enable the guides to reach any bag-blanks which may not be up to the standard size. These notches may be made considerably deeper, as illustrated by dotted lines, to enable the guides to be adjusted inwardly and outwardly for bag-blanks of different widths without entailing the necessity of changing the platform for one of a different size. The guides B' have their bases slotted crosswise of the machine, and are

secured in place by screws b , passing through the slots and engaging with tapped holes in the horizontally-extending portion of the side frames A' A^2 . Hence by loosening the screws the guides may be adjusted nearer together or farther apart and then be may resecured by tightening the screws. The guides B^2 are pivotally connected to horizontally-extending portions of the side frames A' A^2 by means of screws b^6 , which pass through holes in horizontal extensions of these guides, enter tapped holes in the side frames, and may be tightened to secure the guides into any positions into which they may be adjusted.

The bag-blanks are indicated by the letter E . They are made of paper or other suitable material in the form of tubes, which are folded down flat and are open at the two ends, as may be readily understood by reference to Fig. 13, which represents the top of a pile of bag-blanks with the uppermost blank in the pile slightly advanced relatively to those below it in the direction of the gripping-cylinders. It will be observed that at one end of the blanks—the end which is toward the gripping-cylinders—there are lips e . Each bag-blank has but one of these lips, and that is upon the upper side, or, in other words, upon the upper side of the material.

B^3 are front gages, against which the forward ends of the bag-blanks bear when properly placed upon the platform. These gages are stationary and are secured to one of the cross-bars A^3 of the machine-framing. B^4 designates movable front gages consisting of arms secured to a rock-shaft C^2 , extending crosswise of the machine and journaled in the framing thereof. On this rock-shaft is an arm c^{12} , and this is connected to a rod c^{13} , that slides between the shaft D and a pin c^{14} . A cam c^{15} on the shaft D operates upon a roll c^{16} of the rod c^{13} , thereby moving the rock-shaft C^2 so as to swing the gages B^4 toward the pile of bag-blanks. The reverse movement of this rock-shaft and the gages B^4 is effected by a spring c^{17} , connected at one end with the side frame A' and at the other end with an arm c^{18} , which is affixed to the rock-shaft.

The gages B^3 will not extend above the uppermost bag-blank. The gages B^4 , however, extend above the uppermost bag-blank. When the operator desires to have a bag-blank fed forward, he pushes the uppermost one forward until it touches the gages B^4 and presses upon the next bag-blank below, so as to prevent it from being moved forward when the uppermost bag-blank is fed. The gages B^4 move forwardly when the uppermost bag-blank is fed forward, so as not to interfere with the feeding.

F' F^2 designate the gripping-cylinders moving in the direction indicated by the arrows, Fig. 14, and having grippers f' f^2 , each gripper consisting of a finger mounted upon an oscillating rod journaled to lie within recesses formed in the peripheries of the cylinders. Each gripper swings nearly a half-circle, so

that at one end of its motion it will point in the reverse direction to the direction in which it points when at the other end of its motion. The gripper of the cylinder F' , as represented in Fig. 14, has moved from the position indicated in dotted lines into the position in which it is represented in bold lines, and is just ready to close upon the lip e of the uppermost bag-blank of the pile E on the platform. When it closes upon said lip, the subsequent movement of the cylinder effects the feeding of the bag-blank into the machine, it being then drawn over a supporting-plate G , whereby it is prevented from bulging or sagging down out of place. The bag-blank is carried forward by the gripping-cylinder F' until the gripper f' of that cylinder is carried into the position which in dotted outline it is represented as occupying in the upper portion of Fig. 14. Before it reaches this position the two opposite sides of the bag-blank will have been partly opened by an opener consisting of a needle or needles H , which are carried by the gripping-cylinder F' , move outwardly through the thickness of the bag-blank contiguous to that cylinder, and, pressing against the other thickness or wall of the bag-blank, push it away toward the gripping-cylinder F^2 . When the gripping-cylinder F' shall have carried its gripper f' into the position represented in dotted outline at the upper part of Fig. 14, the gripping-cylinder F^2 will have carried its gripper f^2 into an opposite position, and by the time the latter reaches this position it will have closed inward against its cylinder. The bag-blank having been opened before this, the gripper f^2 when it closes will secure to the cylinder F^2 that wall or thickness of the bag-blank which has not the lip e . The gripper f^2 in turning to its closing position makes an extended sweep toward the cylinder F' , and this insures its entering into the bag-blank and engaging with that wall of the bag-blank which it is designed to secure to the cylinder F^2 .

It will be understood from this description that in the operation of feeding, first, the gripper f' secures one wall of the bag-blank to the cylinder F' , then the opener opens the bag-blank, and subsequently the gripper f^2 of the other gripping-cylinder F^2 engages with the other wall of the bag-blank, or, in other words, with that wall which was not gripped by the gripper of the cylinder F' . The rotation of the gripping-cylinders after the two walls of a bag-blank have been secured to them operates to open the bag-blank still further.

Before proceeding further with a description of the operations performed in constructing the bottom of a bag, I will explain the manner in which the grippers and the opener are operated.

The rods f , on which the grippers f' f^2 are secured, have fastened to one end a head f^3 , provided with four arms. The head f^3 , belonging to the gripper f' , operates in conjunc-

tion with studs f^6 f^7 , secured to the brackets supported by the side frame A' and having an adjustable connection therewith by means of slots in the brackets, through which the shanks of the studs pass, and screw-nuts for clamping the studs to the slotted portions of the brackets. The head f^3 , belonging to the gripper f^2 , operates in conjunction with studs f^8 f^9 , supported by the side frame A' . One of the arms of each head f^3 has pivotally connected with it one end of a rod f^4 , with which a spring f^5 is so combined as to complete the oscillation of the rod belonging to such head to the extreme limit of its movement after it shall have been partly oscillated by the operation of the head f^3 with the studs.

The opener H , as shown, (see particularly Figs. 8 and 9,) consists of two needles h , extending from arms h' , secured to a rock-shaft h^2 . These needles work through holes in the periphery of the gripping-cylinder to which they belong. Said rock-shaft h^2 has secured to it an arm h^3 , which by a spring h^4 , attached to it and to the shaft F of the corresponding gripping-cylinder, is pulled in such direction as to oscillate the shaft h^2 in a direction to move the needles h inward into the gripping-cylinder. The inward movement is limited by a stop-pin h^5 , fastened to one of the arms or spokes of the cylinder. The arm h^3 of each opener H has a triangular projection h^6 , which extends outwardly toward the side frame A , and on coming in contact with a projection or stud h^7 is swung outwardly toward the periphery of the cylinder, so as to effect the outward movement of the needles. The stud h^7 is arranged to move the needles outward at the time indicated in my previous explanation of the operation of the opener, and as soon as the arm h^3 is carried past the stud h^7 the needles are withdrawn.

On the gripping-cylinder F' are circumferentially arranged slitting-knives I , and the opposite portion of the cylinder F^2 is provided with a plate I' of suitably soft material—such as brass—to sustain the bag against the action of the slitting-knives. This plate may be secured to the cylinder F^2 by screws having their heads countersunk into it so as not to project beyond the surface. The knives I are shown as set into circumferential grooves i' , formed in the exterior of the cylinder F' , and as held in place by segmental plates i , fastened by screws or otherwise to the outer surface of the said cylinder adjacent to said grooves and having outwardly-flaring side edges overlapping the beveled surfaces of the knives. I provide three sets of grooves i' , so as to allow of the arranging of the knives in any one of three different positions to suit bag-blanks of different widths. They may be secured in any of these positions by properly securing the segmental plates. These knives I slit the bag-blanks from the forward end downward a short distance—as, for example, to the extent indicated by the dotted lines, which in Fig. 13 extend length-

wise of the top bag-blank. This slitting is of course done while the two walls of the bag-blank pass between the adjacent portions of the two gripping-cylinders. When the grippers f' f^2 of the two cylinders pull upon the two portions of a bag-blank gripped by them, they pull out tongue-like portions e' e^2 . (See particularly Figs. 15, 16, and 17.) The strain thus exerted also pulls the two portions e^3 e^4 of the bag-blank which are intermediate of the tongues e' e^2 in the direction of the axes of the two gripping-cylinders, and consequently toward each other, as may be readily understood by reference to Fig. 15, which, as before stated, is a top view of portions of the two gripping-cylinders. The portions e^3 e^4 , after being thus drawn toward each other, are flattened down by oscillating arms J, which are made very light, preferably of flexible resilient metal—such as thin steel—and are secured to a rock-shaft j , journaled in brackets sustained by the side frames A' A^2 . Normally these arms are held in an elevated position by means of a spring j' , connected to a fixed portion of the machine-framing and to an arm j^2 , secured to the rock-shaft j , the latter being limited in the movement which it derives from the spring by a stop-pin j^3 . The arms are depressed by means of an arm f^{10} , carried by the shaft F of the gripping-cylinder F' , contacting with an arm j^4 , which is affixed to the rock-shaft j . The arm j^4 , it will be observed, is curved at the lower extremity, and at this point it will preferably be made somewhat flexible or resilient. The arm f^{10} is so arranged upon the shaft F, whereby it is carried, that the arms J will be depressed just before the gripper f' releases the wall of the bag-blank having the lip e . By the descent of the arms J the portions e^3 e^4 of the forward end of the bag-blank are flattened down, as represented in Fig. 16.

K designates swinging arms affixed to a shaft k , which is supported in bearings provided in the side frames A' A^2 and having at one end a head k' . This head k' has a toe k^2 , which is adapted to contact with one of the horizontal surfaces of the side frame A' for the purpose of preventing the arms K from being swung too far up. A spring k^3 , connected to the head and to a fixed part of the frame A' , rocks the shaft as far as the toe k^2 will permit it to be rocked. The shaft is moved in the other direction to cause the arms K to swing downwardly and rearwardly by means of an arm f^{12} , affixed to the shaft F on the gripping-cylinder F^2 , acting upon an arm k^4 , secured to the head k' of the shaft k . The arms K have their lower ends bent inwardly toward each other to extend over the bag-blank, and when they swing downwardly their inwardly-bent portions will swing under that part of the flattened-down end portion of the bag which laps over the body of the bag-blank, and thereby will fold the material of the bag-blank inwardly neatly, taking out

any wrinkles that may have previously existed.

L designates a roller, under which a bag-blank passes after the flattening down of the portions e^3 e^4 in the manner described. This roller has two spiral grooves extending from a point near the middle in reverse directions toward the ends. Hence as it rotates it tends to spread out the blank laterally.

The bag-blank after leaving the roller L is passed onto a table M, motion being given to it by the gripping-cylinder F^2 , until its forward end passes between pairs of belts N' N^2 , which pass around wheels n' n^2 n^3 n^4 and rolls n^5 n^6 , mounted on shafts journaled in the side frames A' A^2 . Belt-tighteners n^7 n^8 n^9 n^{10} may be used for producing a proper tension upon the belts, and these will preferably comprise flanged pulleys which will constitute guides for preventing the slipping of the belts sidewise off the wheels and rolls. Pairs of rolls n^{15} n^{16} are arranged between the wheels n^3 n^4 and the rolls n^5 n^6 . The rolls n^{16} are supported in arms n^{18} , pivotally connected to brackets n^{19} , secured to the table M, and are wide enough to allow of considerable shifting of the belts N' N^2 sidewise. The rolls n^{15} are mounted loosely upon studs n^{17} , which are adjustable in brackets n^{18} , secured to the table M, so that said rolls may be laterally adjusted.

O designates a pan containing paste or other adhesive substance and having a roller O' , journaled to rotate within it and pick up the substance contained therein and transmit it to another roller O^2 , which is journaled in the frames A' A^2 to rotate in contact with the roller O' .

O^3 is a segment mounted on the shaft to which the belt-wheels n' are affixed. It periodically revolves into contact with the roller O^2 and so has the adhesive substance applied to certain portions of its surface which project. The shaft which has the wheels n^2 affixed to it is provided with a drum O^4 beneath the segment for the purpose of supporting a bag-blank.

O^6 is a scraper, consisting, preferably, of a strip of brass, for keeping the drum O^4 clean and freeing it from the adhesive substance which may be transmitted to it. It may be fastened to any fixed portion of the machine—as, for instance, a rod o , supported by the side frames A' A^2 . The table M has an opening opposite the drum O^4 . The segment will carry the paste down upon the bag-blank and apply it thereto, as indicated by the dotting in Fig. 17.

O^5 designates a wire extending, as here shown, from the support of the pan O downwardly and rearwardly at a point about midway between the ends or side edges of the segment O^3 . The segment has a circumferential groove which fits over the wire O^5 . The bag-blank passes under the wire and the latter serves to prevent the segment from lifting

it up in case the bag-blank should adhere slightly to the segment.

As the bag-blank moves forward after being pasted it is subjected to the action of creasers $P' P^2$, consisting of blades or strips secured to arms mounted upon the shaft to which the wheels n^3 are affixed. The shaft upon which the wheels n^4 are affixed has mounted upon it a drum P at a point beneath the creasers. Opposite this drum an opening is formed in the table. That portion of the drum P which will be opposite the creasers when the creasers operate upon the bag-blank is recessed and has strips p^{10} , of some soft material—such, for instance, as brass—inserted within it and secured by screws or otherwise, grooves being provided in this material to correspond with the creaser-blades. These creasing-blades crease the bag-blank on the lines $p' p^2$, (shown in Fig. 17) adapting it to be readily folded over on these lines. The drum P has a circumferential groove p^{11} , and the strips p^{10} are grooved in line with this groove. The object of these grooves is to accommodate a wire p^{12} , which at the forward end may be secured to the under side of the table M and at the rear end extended under the table. This wire, by extending through the grooves of the drum and its strips and being beneath the bag-blanks as they pass through the machine, prevents the bag-blanks from adhering to the drum and being carried down under the table by the drum.

Q designates a folding-plate for folding the bag-blank over upon the line p' , Fig. 17. It is fastened to an arm q , that is pivoted to a rod q' , the latter being secured to an arm q^2 , that is fastened to a rock-shaft Q' . A spring q^3 , secured at one end to the arm q and at the other to the arm q^2 , serves to rock the arm q , so as to bring its upper end nearer to the arm q^2 , and consequently move the plate Q in the reverse direction. The action of this spring is limited by a stop q^4 , consisting of a portion of the arm q^2 projecting into the plane of the arm q . On the shaft Q' an arm q^5 is affixed, and to this is connected a rod q^6 , that is provided with a projection or bowl q^7 , reciprocated by a cam Q^2 , affixed to the shaft upon which the belt-wheels n^4 are mounted. The rod q^6 is slotted to embrace this shaft. The cam Q^2 is composed of two sections $q^8 q^9$. The section q^8 is rigidly secured to its supporting-shaft and the section q^9 is adjustably secured to the section q^8 by means of screws passing through segmental slots, with which the section q^8 is provided. These slots are concentric with the shaft. Hence the section q^9 may be adjusted to advance it or move it backward relatively to the section q^8 .

Q^4 is a stationary cam-rod supported by an upright that is erected upon the side frame A' . It is in such position that when the arm q^2 swings downwardly and rearwardly a roller q^{10} , which is journaled upon the upper end of the arm q , will contact with it, and as a result the arm q will be rocked relatively to the arm

q^2 in such direction as to bring the plate Q parallel with the table M. The swinging of the arm q^2 brings the plate Q down upon the bag-blank before the tilting of the plate, which is incident to the swinging of the arm q relatively to the arm q^2 , begins, so that the plate will be sure to work under that portion of the bag-blank which is provided with the lip e . After the plate has passed under said portion of the bag-blank it will be tilted into a horizontal position by the action of the cam-rod Q^4 . As the plate will move faster than the bag-blank is fed forward, it will soon move far enough under the forwardly-folded part of the bag-blank to turn the extremity rearward upon the line p' . By the operation of the plate Q the folding of the bag-blank along the line p' will be completed before the bag-blank reaches the rolls $n^5 n^6$ and other rolls mounted upon the same shaft with them.

Q^6 designates a plate attached to an arm q^{12} , which is pivoted by a pin q^{13} to the cam-rod Q^4 . This arm and the plate Q^6 swing upwardly and downwardly, the downward movement being caused by gravity and being limited by a stop-pin q^{14} , affixed to the cam-rod Q^4 . The upward movement of the arm q^{12} and blade Q^6 is effected by an arm q^{15} , which is affixed to the shaft Q' , said arm q^{15} being connected with the arm q^{12} by means of a spring q^{16} . The arm q^{12} and blade Q^6 will descend when permitted by oscillation of the shaft Q' , and in such time as that the blade will drop in the way of the portion e^2 of the bag-blank and obstruct its movement, so that by the advance of the bag-blank this portion will be raised to such a degree that before it passes under the rolls $n^5 n^6$ and the other rolls upon the same shaft it will have been doubled over upon the line p^2 . The rolls $n^5 n^6$ and their fellows press down the folded-over portions of the bag-blank and cause the same to be united to those parts of the bag-blank upon which the folding is done. In this work the said rolls are assisted by other pairs of rolls n^{10} , arranged rearward of them.

The shaft D is the driving-shaft of the machine. Motion is transmitted through it by gear-wheels to the gripping-cylinders $F' F^2$, stretching-roller L, pasting-rollers $O' O^2$, the shafts of the belt-wheels $n' n^2 n^3 n^4$, segment O^3 , drum O^4 , creasers $P' P^2$, drum P, and the shafts carrying the rolls $n^5 n^6$.

Provision is afforded at every point for effecting adjustments of this machine necessary to adapt it for bag-blanks of different sizes. The guides $B^2 B^4$, it will be remembered, are adjustable widthwise of the machine. The stud f^6 , being adjustable in its bracket, provides for varying the time at which the gripper of the gripping-cylinder F' will be opened to release a bag-blank, as may be necessary for bag-blanks of different sizes. The adjustability of the slitting knives or cutters I is for the same purpose of suiting bag-blanks of different widths. The arms J, being secured by set-screws to the shaft j , are ca-

pable of adjustment in the same direction. The arms K, being fastened by set-screws on their shaft k , are capable of adjustment laterally. The belt-wheels n' n^2 n^3 n^4 and the rolls n^5 n^6 are fastened on their shafts by set-screws, so as to be adjustable laterally. The rolls n^{15} , being supported on laterally-adjustable studs, are adaptable to bag-blanks of different sizes, and as their fellies n^{16} are made very wide the latter do not require adjustment. The pasting-segment has a removable face, which may be replaced by another of a different size. The creasers P' P^2 may be removed from their arms and others may be attached. The arms, being independently secured to the supporting-shaft by set-screws, can be independently adjusted. The strips p^{10} in the drum P may be detached from the drum and replaced by others of different lengths and inserted in different grooves in the drum, so as to be separated different distances. The cam O^2 is adjustable, as before explained, to time the operation of the folding-plate Q to suit bag-blanks of different sizes. The adjustable crank c^6 for operating the ratchet c^2 , through which motion is imparted to the platform B, is also adjustable to suit different bag-blanks.

In Figs. 10, 11, and 12 I have shown mechanism whereby the top bag-blank may be advanced automatically instead of being advanced by hand. In these figures R designates a shaft supported in brackets r , attached to the side frames A' A^2 . On this shaft is affixed an arm r' , which at the outer end is pivotally connected to a rod r^2 , which slides in a bearing r^3 , attached to the side frame A^2 . The shaft F of the gripping-cylinder F' has affixed to it a cam r^4 , which once in every revolution moves the rod r^2 downwardly, thereby oscillating the shaft R. The rod r^2 is moved upwardly and the shaft R oscillated in the reverse direction by means of a spring r^5 , connected with the arm r' and bearing r^3 . The shaft R has also affixed to it an arm r^6 , which at the outer end is bifurcated, and at the inner end of its bifurcate arms or portions has a V-shaped tongue-like portion r^7 . Between the bifurcate arms or portions a movable end section r^8 is pivoted by a pin r^9 . The rear of this end section is V-shaped and laps over the V-shaped tongue r^7 , but being slightly larger permits of the oscillation of the end section r^8 relatively to the arm r^6 . There is to be a certain amount of friction exerted between the end section r^8 and the arm r^6 , so that the end section will be capable of remaining in any position into which it may be adjusted until shifted by the application of sufficient force. The friction is provided by making a pin r^{10} in the form of a screw, which engages with one of the bifurcate portions of the arm r^6 , and placing washers between the two bifurcate portions and the end section. In the gripping-cylinder F' is a groove f^{30} , and on the end section r^8 is a projection r^{10} , which when the arm r^6 is moved upward will enter the groove f^{30} . When the

end section contacts with the gripping-cylinder, it will be bent downward relatively to the arm r^6 . At the outer end of the end section is a needle or small rod r^{11} , which may be clamped in a split socket formed in the free extremity of the end section r^8 , the exterior of the socket being screw-threaded and having a nut applied to it. The lower extremity of this needle is shouldered, and beyond its shoulder has a point r^{12} , which is bent slightly rearward or away from the shaft R, and is sufficiently long to enter through the upper wall or thickness of a bag-blank. When the arm r^6 is swung downwardly, the point of the needle r^{11} will enter the upper wall of a bag-blank, and as the downward movement of the arm r^6 continues its end section r^8 will be swung into line with it, and this movement will cause the point of the needle r^{11} to move rearwardly and propel the bag-blank rearwardly. When the arm r^6 rises, it will lift up the bag-blank and facilitate its engagement with the gripper f' of the gripping-cylinder F'.

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

1. The combination of a platform for holding a number of bag-blanks, a gripping-cylinder for feeding the same one at a time forward, and a swinging arm having an end section connected so as to swing independently and carrying at its extremity a needle for engaging with a bag-blank, substantially as specified.
2. The combination of a platform for holding a number of bag-blanks, a gripping-cylinder for feeding the same one at a time forward, a swinging arm having an end section connected so as to swing independently and carrying at its extremity a needle for engaging with a bag-blank, and a cam on the shaft of the gripping-cylinder for oscillating said arm, substantially as specified.
3. The combination of a platform for holding a number of bag-blanks, a gripping-cylinder for feeding the same one at a time forward, a swinging arm having an end section connected so as to swing independently and carrying at its extremity a needle for engaging with a bag-blank, a cam for oscillating the arm in one direction, and a spring for moving it in the other, substantially as specified.
4. The combination of a platform for holding a number of bag-blanks, a gripping-cylinder for feeding the same one at a time forward, and a swinging arm having an end section connected so as to swing independently and carrying at its extremity a needle for engaging with a bag-blank, said end section having a projection which will contact with the gripping-cylinder to deflect it out of line with the arm, substantially as specified.
5. The combination of a platform for holding a number of bag-blanks, a gripping-cylinder for feeding the same one at a time forward, a swinging arm having an end section extended between a bifurcate portion of the arm, washers intermediate of the arm and

end section, and a screw securing these parts together, substantially as specified.

6. The combination of the platform B, having racks, a shaft provided with gear-wheels engaging said racks and also provided with a worm-wheel, a shaft C', provided with a worm, and a hanger c³, having an inclined slot for elevating one end of the shaft, which is provided with the worm, substantially as specified.

7. The combination, with two gripping-cylinders having independent grippers, of mechanism substantially such as described for operating the grippers of the two cylinders successively and holding them closed until they shall have pulled open the end of a bag-blank, substantially as specified.

8. The combination of gripping-cylinders having grippers f' f² timed to hold opposite walls of a bag-blank open until the same shall have been pulled apart, resilient oscillating arms J, extending over the meeting portions of the gripping-cylinders, and a rock-shaft to which the arms are rigidly attached, substantially as specified.

9. The combination of the gripping-cylinders F' F², grippers f' f², gripper-rods f, heads f³, and the studs for operating upon said heads to operate the grippers successively, substantially as specified.

10. The combination of the gripping-cylinders F' F², grippers f' f², gripper-rods f, heads f³, and the studs for operating upon said heads to operate the grippers successively, certain of said studs being adjustable to provide for varying the time at which the grippers will operate, substantially as specified.

11. The combination of gripping-cylinders F' F², having grippers so timed in operation that the gripper of the cylinder F' will engage with one wall of a bag-blank and the gripper of the cylinder F² will subsequently engage with the other wall of the bag-blank, substantially as specified.

12. The combination, with the gripping-cylinders F' F², having their grippers arranged to operate successively, of an opener

operating intermediately of the operation of the grippers of the two cylinders to open or separate the two walls of a bag-blank, substantially as specified.

13. The combination, with the gripping-cylinders F' F², having their grippers arranged to operate successively, of an opener operating intermediately of the operation of the grippers of the two cylinders and consisting of a needle h, carried by an oscillating arm secured to that gripping-cylinder whose gripper first operates, substantially as specified.

14. The combination, with the gripping-cylinders F' F², having their grippers arranged to operate successively, of an opener operating intermediately of the operation of the grippers of the two cylinders, consisting of a needle h, arm h', shaft h², arm h³, having a projection h⁶, spring h⁴, stop h⁵, and stud h⁷, substantially as specified.

15. The combination, with gripping-cylinders, of the forwardly and rearwardly swinging arms K, substantially as specified.

16. The combination, with gripping-cylinders and upwardly and downwardly oscillating arms J, of the forwardly and rearwardly oscillating arms K, substantially as specified.

17. The combination of the arms K, shaft k, head k', provided with a toe k², arms k⁴, and the arms f¹², moving with the gripping-cylinder F², substantially as specified.

18. The combination, with the gripping-cylinder having a series of parallel grooves i', of knives I and segmental securing-plates i, having inclined edges bearing upon the knives, substantially as specified.

19. The combination of the folding-plate Q, cam-rod Q⁴, arm q, rod q', arm q², and cam Q³, made of sections, one of which is adjustable relatively to the other, substantially as specified.

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Witnesses:

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