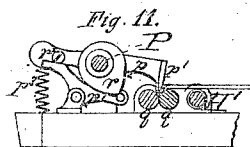
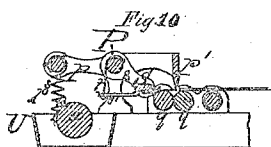
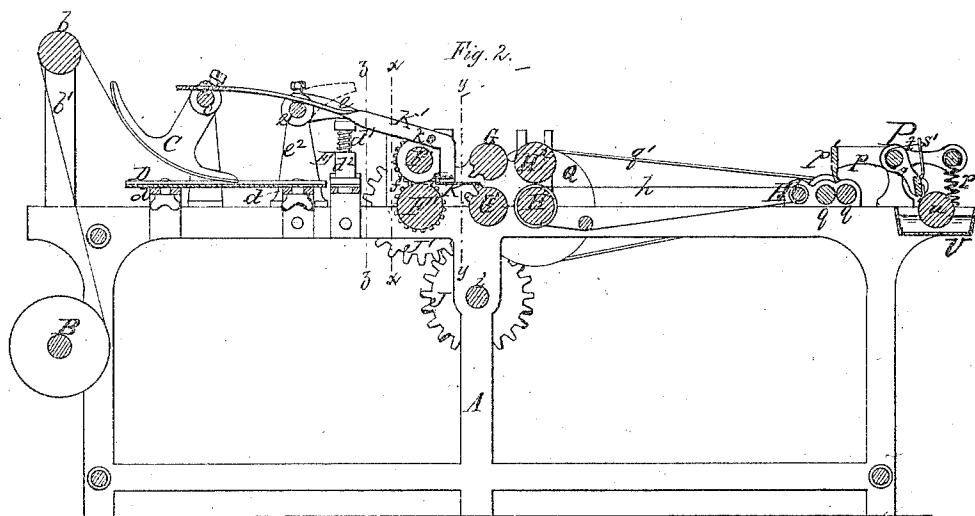
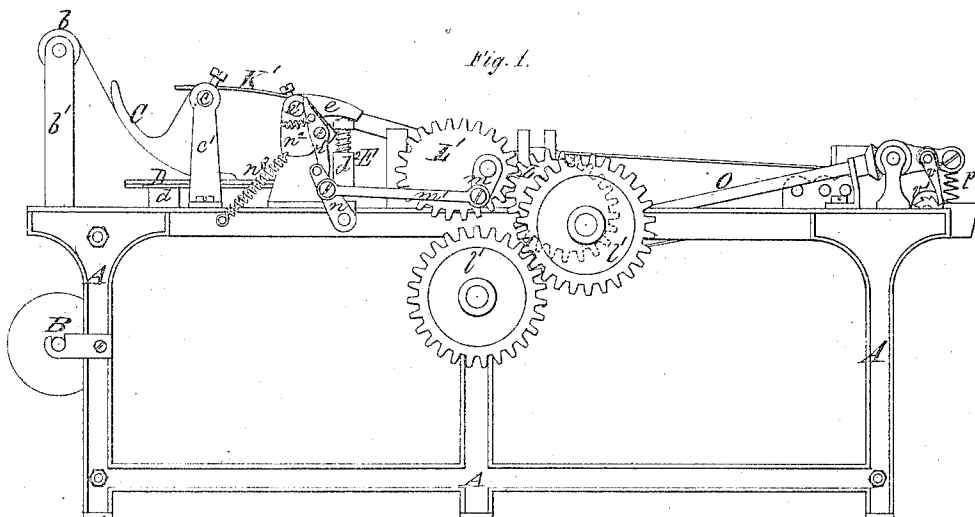


W. LIDDELL.
Paper-Bag Machines.

No. 143,358.

Patented September 30, 1873.



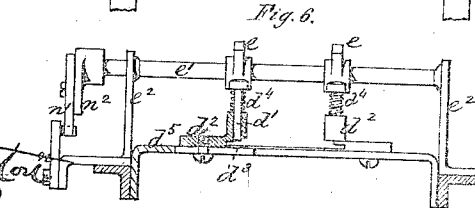
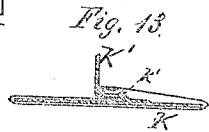
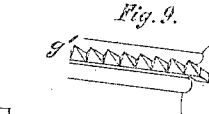
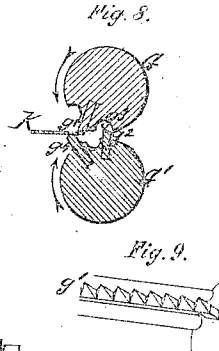
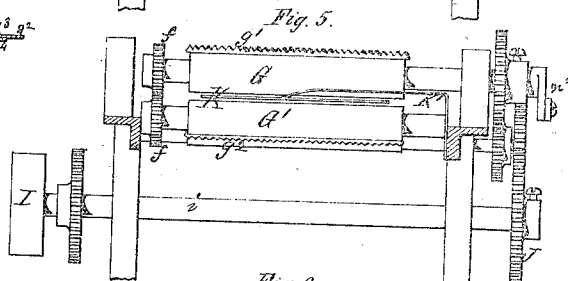
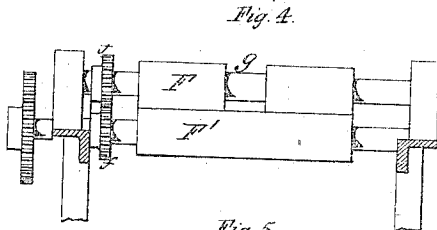
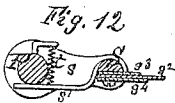
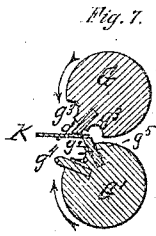
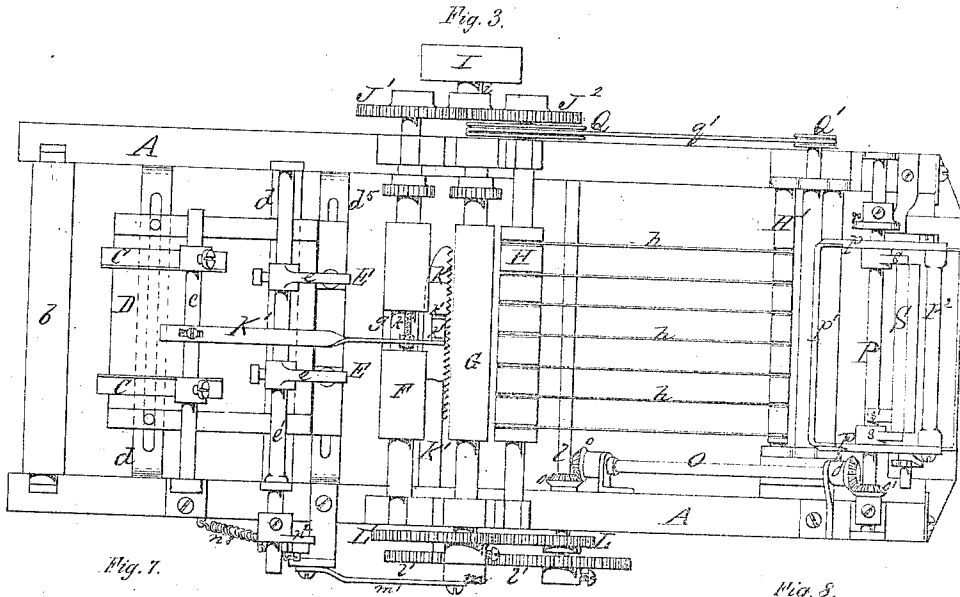
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Witnesses

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by Jay Hyatt
att.

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by Jay Hyatt
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM LIDDELL, OF BUFFALO, NEW YORK, ASSIGNOR OF THREE-FOURTHS
HIS RIGHT TO ROBERT D. HAMLIN, OF SAME PLACE.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. 143,358, dated September 30, 1873; application filed
August 11, 1873.

To all whom it may concern:

Be it known that I, WILLIAM LIDDELL, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Paper-Bag Machines, of which the following is a specification:

My improvements relate to that class of machines which are used in the manufacture of what are known as flat-bottom bags; and the invention consists of certain new combinations and arrangements of parts, hereafter fully set forth, for performing the various operations of forming the paper into a tube, severing the blanks therefrom, and of closing the bottom thereof to complete the bag.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation of a paper-bag machine provided with my improvements. Fig. 2 is a longitudinal sectional elevation, and Fig. 3 a top-plan view thereof. Figs. 4, 5, and 6 are cross-sections in lines *x x*, *y y*, and *z z*, Fig. 2, respectively. Fig. 7 is a sectional view of the cutters in the act of cutting the lower edge of the paper tube. Fig. 8 is a similar view, representing the cutters in the act of cutting the upper edge of the same. Fig. 9 is a detached fragmentary view of the serrated cutter-bar of one of the cutter-rollers. Fig. 10 is a view of the mechanism for pasting the bottom of the bag in the act of applying the paste to the lap. Fig. 11 is a view of the mechanism for folding the bottom of the bag, represented in the act of passing the same between the pressure-rollers. Fig. 12 is an enlarged detached view, showing the construction of the pasting bar or brush. Fig. 13 is a detached view, representing the paper in the act of passing the stationary blade.

Like letters of reference designate like parts in each of the figures.

A represents the side frames of the machine connected by suitable cross-stays, and B the reel arranged at one end of the main frame for receiving the roll of paper from which the bags are to be formed. *b* is an elevated guide-roller revolving in standards *b'* secured to the frames A. C C are two curved or segment-shaped gages or guides suspended from a horizontal cross-bar, *c*, which is supported by a standard, *c'*, secured to one of the side frames A. The gages C C are connected to the cross-bar *c* by

set-screws or otherwise, so that they can be readily adjusted laterally to correspond with the width of different bags. D is the table or platform arranged under the guides C, and secured by set-screws to slotted cross-pieces *d* in an ordinary manner. E E represent two punching devices arranged near the inner end of the table D, for cutting a notch in each edge of the folded paper. They consist each of a vertical punch-rod, *d'*, guided in a bracket, *d''*, provided with a die, *d'''*, and held in an elevated position by a spring, *d''''*. The punch-rods *d'* are operated by striking-arms *e* secured to a rocking shaft, *e'*, turning in bearings *e''*, and operated at suitable intervals, as will be hereinafter described. The brackets or frames *d''* of the punching devices are secured by set-screws to a slotted cross-piece, *d'''*, so as to be adjustable toward and from each other to correspond with different widths of the folded paper. These brackets also serve as guides to the paper as the folded edges pass under the same. F F' are the feed-rollers, which present the paper tube to the revolving cutter-rollers G G'; and H H', two rollers connected by endless cords *h*, forming a carrier, which receives the blank strips after they have been cut off and the side laps pasted together, as will be presently described, and delivers the same to the bottom pasting and folding mechanism located at the opposite end of the main frame. H² is a roller, preferably of wood, mounted in bearings above the roller H, so as to form with it feed-rollers for the blanks after they have been severed by the cutter-rollers. I is the driving-pulley, mounted on a shaft, *i*, and receiving motion in any suitable manner. J is a gear-wheel, mounted on the same shaft, for transmitting motion to the lower feed-roller F' by means of a gear-wheel, J¹, and to the roller H of the endless carrier by a gear-wheel, J². The feed-rollers F F' H H² and the cutter-rollers G G' are geared together by two wheels, in an ordinary manner. *g* represents an annular recess formed in the middle of the upper feed-roller F, for the purpose of preventing the rollers from pressing on the pasted and still disconnected side seam of the paper tube. K represents a stationary knife or blade arranged in front of and parallel with the cutter-rollers G G'. It is provided with a toothed or serrated edge project-

ing between the said cutters, so as to operate in conjunction with the likewise serrated cutting-edges thereof. The blade K has an arm, K', secured to it at or near the center at a very acute angle, so as to allow the unpasted edge of the folded paper to pass in the angle thus formed, while the pasted and overlapping edge passes above the arm K', which is provided on its upper side with two ledges or rails, k', arranged transversely of the arm on which the pasted edge of the paper slides, so that the line of paste on the under side will come between the rails, and be kept thereby from coming in contact with the arm K' as the paper is drawn along, as shown in Fig. 13.

As shown in Figs. 1, 2, and 3, the arm K is bent upward and extends forward to the arm c', to which it is secured by a set-screw passing through a slot in the end of the arm K', by which the blade K is supported in position. k is a screw passing horizontally through the arm K' at the point where the arm passes over the roller F. The screw is of a length equal to the width of the recess g in which it fits, so as to be held against lateral movement by the sides thereof. By turning this screw the arm K' and knife attached can be adjusted laterally to the required position to cause the serrations of the knife to fit between the serrations of the cutter-rollers as the cutters are brought in conjunction, as will be hereinafter described. Nuts may be applied to the screw on each side of the arm K', if desired, to hold the arm in place after it has been adjusted thereon.

In Fig. 5 the arm K' is represented as extending laterally to one side of the machine, where it is secured to the frame. A fragment of this arm is also shown in Fig. 3. I prefer, however, to secure the arm K' in the manner first above described. The lower and upper cutter-rollers G & G' are, respectively, provided with a serrated cutting-edge, g¹ g², the teeth of which correspond with the spaces in the edge of the stationary blade K, and are beveled off on one side, as shown in Fig. 9. The serrated cutters g¹ g² project beyond the surface of the rollers G & G'. The roller G is formed with a longitudinal groove or recess, g³, on each side of the cutters g¹, while the roller G' is constructed with a projecting rib, g⁴, between which and the cutter g² is a groove, g⁵, similar to those in the roller G, into which grooves the cutter g¹ g² and rib g⁴ project as the rollers revolve. l is a transverse counter-shaft receiving motion from the main driving-shaft i by a pair of gear-wheels, V V'. L L' represent a pair of elliptic gear-wheels connecting the counter-shaft l with the shaft of the upper revolving cutter G, so as to produce a variable rotary motion of the latter, for a purpose presently to be explained. This motion can be readily regulated by changing the position of one of the elliptic gear-wheels on its shaft, one of which is secured by means of a set-screw for this purpose. m is a crank mounted on the outer end of the shaft of the upper cutter G,

and connected by a rod, m', with a rocking lever, n, turning on a stud projecting from the side frame A. The lever n engages with a spring-pawl, n', attached to a plate, n², which is secured to the outer end of the rock-shaft e', as clearly shown in Figs. 1 and 6. Each revolution of the crank m causes the rocking-lever n to raise the striking-arms e until the pawl n' is released, when a reacting spring, n³, connecting with the plate n² causes the arms e to descend, whereby a sharp blow is given to the punch-rods d', which are then returned to their elevated position by the springs d⁴. O is a longitudinal counter-shaft supported in bearings attached to one of the side frames A. It is connected with the transverse shaft l by a pair of bevel-wheels, o o, and transmits motion to the shaft P of the bottom pasting and folding mechanism by a similar pair of wheels, o' o'. p p are two oscillating arms mounted loosely on the shaft P, and carrying between their inner ends the transverse folding-blade P', while their outer ends are connected by a cross-bar, p². A spring, p³, connects the outer end of one of the arms p to the frame of the paste-receptacle, and operates to elevate the folding-blade after it has completed its downward or folding movement. r represents a cam secured to the shaft P, and engaging with one end of a two-armed rocking lever, r¹, the opposite end of which engages with a stud or projection, r², on the arms p, so that the latter are oscillated once for each revolution of the shaft P. s s are two radial arms secured to the shaft P, so as to revolve therewith, and arranged between the oscillating arms p. The pasting-bar S, pivoted between the arms s, is provided with an arm, s¹, which rests against the shaft P when the pasting-bar is in a radial position. A spring, t, connects this arm with the shaft, and serves to return the pasting-bar to this radial position after it has been swung out of this position during the operations of receiving paste and applying it to the end of the passing blank. The bar S is provided with a yielding ledge, s², of rubber, leather, or other suitable material, for taking the paste from the paste-roller and applying it to the bottom lap of the bag. It is secured to the bar S between two plates, s³ s⁴, by screws, as shown in Fig. 12. U is the paste-receptacle, and u the paste-roller arranged therein at the proper distance from the shaft P. An intermittent motion is imparted to the paste-roller u from the shaft P by means of spring-pawl v and ratchet-wheel v' in a common manner. q q represent two pressure-rollers arranged in close contact with each other, their line of contact being directly under the folding-bar p'. They are driven from the shaft of the carrier-roller H by means of two pulleys, Q Q', and an endless belt, q', as clearly shown in Figs. 2 and 3.

The web of paper is passed from the reel B over the guide-roller b, where paste is applied to one edge, by a paste-wheel in a common manner, whence it passes under the former's or creasers C C, by which the two edges thereof

are partially folded over, and thence through the notches in the punch-frames or brackets d^2 to the feed-rollers $F F'$, which press down the folds on each side. From the feed-rollers $F F'$ the tube of paper is passed to the stationary blade K , with one side above and the other below, as clearly shown in Figs. 5 and 13. The paper tube projected beyond the blade K enters between the rollers $G G'$, which are so adjusted as to bring the cutter g^2 of the lower roller in engagement with the blade K at the time the length of a blank bag has passed this point, when the cutter g^2 raises slightly the blade (which the elasticity of the arm K' permits) until the beveled side of the teeth of the cutter g^1 comes in contact with the upper side of the blade at a point a little back of the cutter g^2 , so as to form a stop during the time the latter is severing the under side of the paper tube, as shown in Fig. 7. As soon as the teeth of the cutter g^2 become disengaged from the teeth of the blade K , the cutter g^1 will have advanced so as to engage therewith, slightly depressing the blade K , when the stop g^1 will have come in contact with the under side thereof, so as to support the blade while the upper side of the paper is being severed. It will be observed that the teeth of the cutters $g^1 g^2$ operate in conjunction with the teeth of the blade K as shears in severing the paper instead of tearing it apart; and that the successive operation of the cutters $g^1 g^2$ cut the blank with one side a little longer than the other, for a well-known purpose. While this operation is being performed the punches are struck by the arms e , and a semicircular or V shaped notch thereby cut in each side of the tube at the point at which the next bag is to be severed from the tube. This notch, at the point at which the web is folded, insures a clear cut as the paper is severed, and a more perfect closing of the bottom of the bag. The rollers $G G'$ do not revolve in contact with each other, but are arranged so as to have sufficient space (about three-eighths of an inch) between them for the free passage of the blank, these rollers acting merely as guides to direct the paper tube between rollers $H H^2$, which carry it forward onto the endless carrier $h h$. The elliptical gear-wheels $L L^1$ are, preferably, so adjusted on their shaft as to impart to the cutters $g g^1$, at the time of severing the paper, a motion a little faster than that of the advancing paper tube, so as to take up any slack in the paper, and to carry the blank forward, after it is cut off, out of the way of the end of the tube from which it was severed. The rollers $H H^2$ should also revolve with sufficient velocity to impart to the blank a slightly accelerated motion, so as to prevent the serrated and contiguous ends of the blank and tube from interfering with each other.

The operation of severing the blank from the paper tube presses the laps of the side joint together at this point, when the carrying-rollers $H H^2$ complete the joint as the blank passes between them. The roller H^2

and a similar one arranged over the roller H^1 may also be connected by endless cords so as to press the blank upon the cords h , and thus prevent it from being blown off or displaced as it is being carried forward to the pasting and folding mechanism. As the forward end of the blank is projected over the pressure-rollers the required distance, the brush s^2 of the revolving pasting-bar, which has, as the latter revolved, been brought in contact with the paste-roller, as shown in Fig. 2, transfers the paste thereon to the end of the blank, as represented in Fig. 10, when the folding-blade descends and the bottom lap of the bag is formed and closed by the pressure-rollers in an ordinary manner, as shown in Fig. 11. The pasting-bar, being pivoted between the arms s , turns on its pivots as the brush s^2 comes in contact alternately with the paste-roller and end of the paper blank, so as to permit it to pass the same, as shown in Fig. 10, the spring t returning the bar and brush to their former radial position after they have become disengaged therefrom. The length of the brush s^2 should be just equal to the width of the bag, so as not to apply paste to the folding-roller at either side of the edge of the paper. The manner of securing the brush in place permits the brush to be readily removed and others substituted corresponding in width with bags of different sizes.

Although two rails or ledges, k' , are shown attached to the arm K' for the pasted edge of the paper to ride upon, the one for supporting the extreme edge of the paper is not absolutely necessary.

What I claim as my invention is—

1. The combination, in a paper-bag machine with a stationary blade or cutter, of the rollers $G G'$ provided with cutters $g^1 g^2$, substantially as and for the purpose hereinbefore set forth.
2. The combination, with the stationary blade K , of the supporting-arm K' , attached thereto, so as to permit the passage of the overlapped and unfastened edges of the folded-paper tube, substantially as hereinbefore set forth.
3. The combination, with the rollers $F F'$, the former provided with a recess, g , of the stationary knife and arm $K K'$ and ledge k' , substantially as and for the purpose hereinbefore set forth.
4. The combination, with the knife and arm $K K'$, and roller F provided with recess g , of the adjustable screw k , arranged substantially as and for the purpose hereinbefore set forth.
5. The combination, with the guide-roller b and curved gages $C C$, of the edge punches E and guide-brackets d^2 , substantially as and for the purpose hereinbefore set forth.
6. The combination of the edge punches E , striking-arms $e e$, and rock-shaft e' , substantially as and for the purpose hereinbefore set forth.
7. The combination, with the edge punches, rocking shaft e' , and striking-arms $e e$, of the plate a^2 , return-spring a^3 , pawl a' , oscillating

arm *n*, pitman *m'*, and crank-arm *m*, substantially as and for the purpose hereinbefore set forth.

8. The combination, with the cutter-rollers *G G'*, of the elliptical gear-wheels *L L'*, for imparting a variable motion to the cutter-rollers, substantially as and for the purpose hereinbefore set forth.

9. The combination, with the shaft *P* actuated by the countershaft *O*, of the revolving pasting-bar *S*, folding-blade, and rocking arms

p' p, rocking-lever *r'*, and cam *r*, substantially as and for the purpose hereinbefore set forth.

10. The combination, with the shaft *P*, of the arms *s s* and paste-roller *u*, pivoted pasting-blade *S* provided with arm *s'*, and reacting spring *t*, substantially as and for the purpose hereinbefore set forth.

WILLIAM LIDDELL.

Witnesses:

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PORTEE NORTON.