(No Model.) 2 Sheets—Sheet 1.

W. LIDDELL.

PAPER BAG MACHINE.

No. 492,498. Patented Feb. 28, 1893.

Fig. 1.

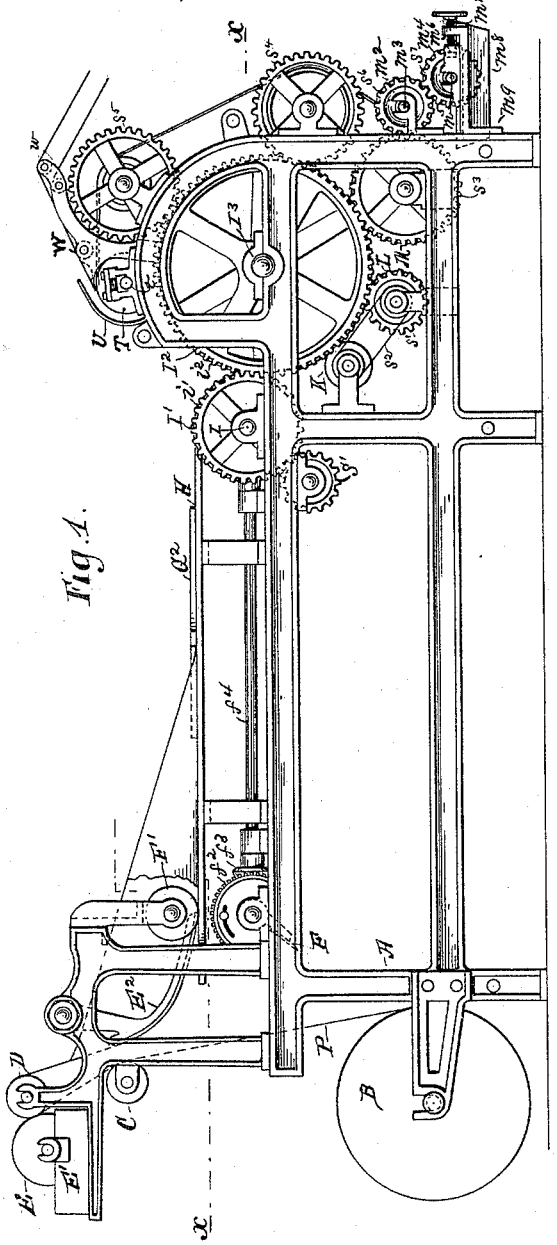


Fig. 2.

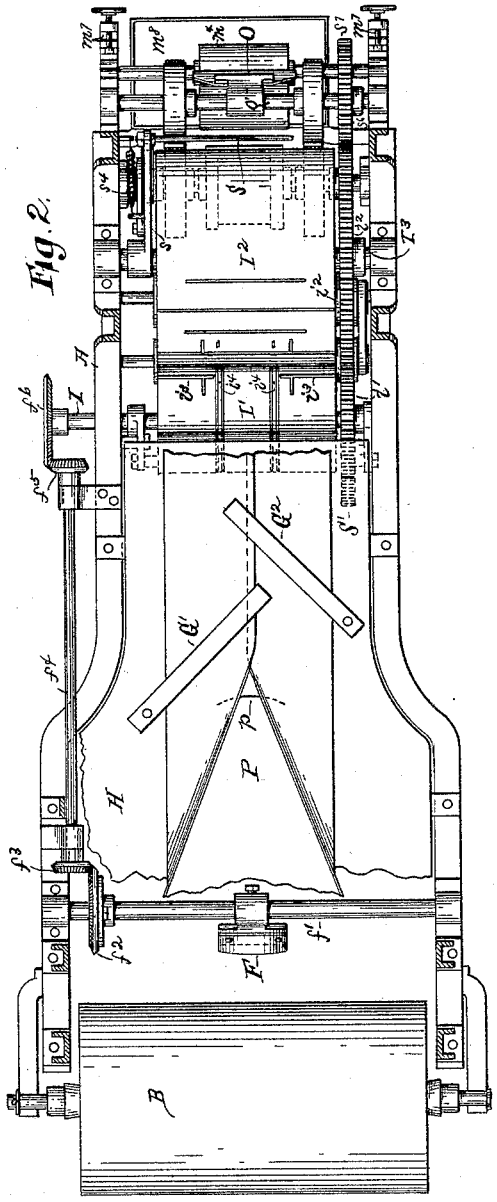
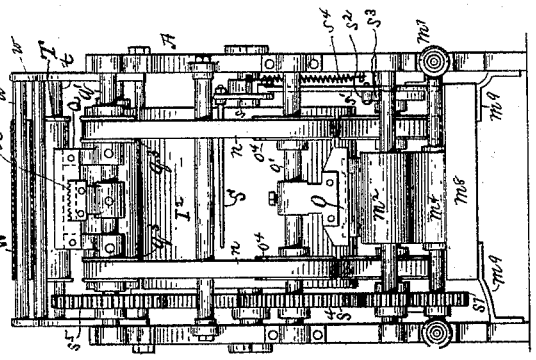


Fig. 3.



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By his attorney
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(No Model.) 2 Sheets—Sheet 2.

W. LIDDELL.

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Fig. 5.

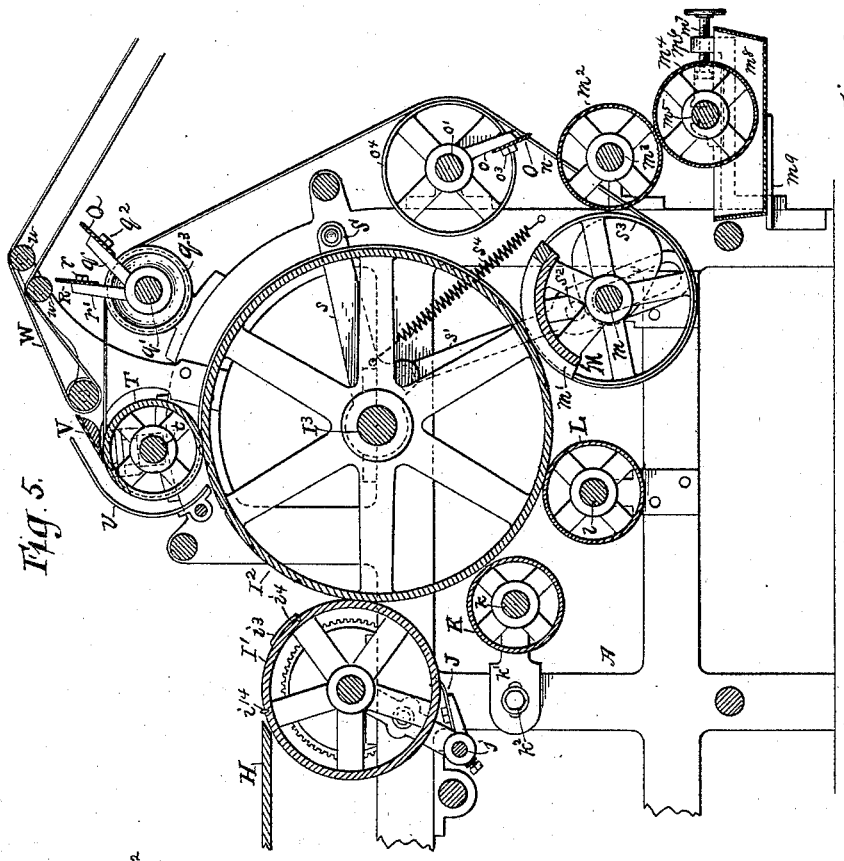


Fig. 8.

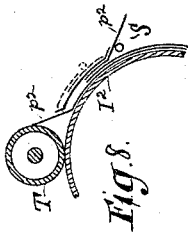


Fig. 4.

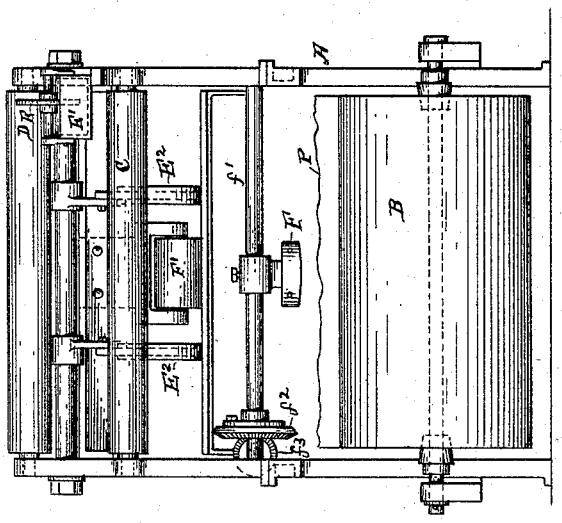


Fig. 9.

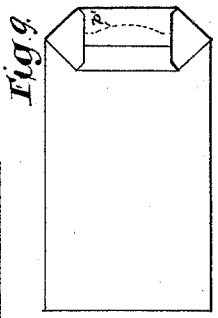


Fig. 7.

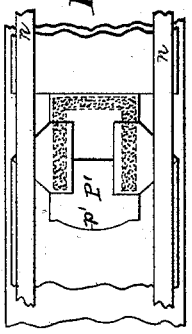
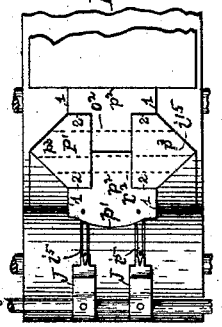


Fig. 6.



Witnesses
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C. R. Ferguson

Inventor
William Liddell
By his attorney
Edwin H. Brown

UNITED STATES PATENT OFFICE.

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PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 492,498, dated February 28, 1893.

Application filed March 16, 1892. Serial No. 425,095. (No model.)

To all whom it may concern:

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

My present improvement relates to a paper bag machine which forms the tubing for paper bags and also constructs the bottoms of the bags.

I will describe a paper bag machine embodying my improvement and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my improvement. Fig. 2 is a horizontal section of the same taken at the plane of the dotted line *x x* Fig. 1. Fig. 3 is an elevation of that end of the machine from which the finished bags are delivered. Fig. 4 is an elevation of that end of the machine where the work of forming the tubing for paper bags is performed. Fig. 5 is a central vertical section on a larger scale of that end of the machine wherein the bottoms of the paper bags are formed. Fig. 6 is an inverted plan of certain parts co-operating to contribute to the forming of the bottoms of the bags. Fig. 7 is an inverted plan of certain parts which contribute to the forming of bag bottoms. Fig. 8 is a vertical section illustrating parts co-operating to complete the bag bottoms. Fig. 9 is a plan view of a completed bag bottom.

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

The framework, A, of the machine may be of any suitable construction. It is shown as consisting of iron side frames which are connected by suitable cross pieces or stretchers.

B designates a roll upon which paper employed in the manufacture of bags is wound. Its journals are supported in open topped bearings in brackets extending from the side pieces of the framework A. The paper after leaving the roll B, passes around a guide roll, C, journaled in brackets extending from the side pieces of the framework A and thence around a roller, D. Opposite the roller D is a roller E which runs in a tank of paste E′ supported by extensions of the side pieces of the framework A. Paste is applied by this roller to the strip of paper near one edge, so that when the paper is folded over, its edges will be united to the opposite edge. After passing around the roller D, the paper passes under a longitudinally curved folder, E^2 E^2, which bends the strip of paper P, so that its side edges will converge. Just beyond the folder, a revolving cutter, F, is located. Above this cutter is a roller F′. The office of this cutter is to cut an arc-shaped slit *p* in the strip of paper P.

Before describing the details of the mechanism by which the cutter is carried and operated, I will explain that the purpose of the arc-shaped slit *p* is to form a portion of the edge of each bag blank P′. It may be well for me to further explain at this point that in this machine the paper strip is not severed until bag blanks are completed for the formation of bags.

After the bending of the strip of paper P by the folder E^2, it will be passed under strips G′ G^2. It will be seen by reference to Fig. 2 that the edge portions of the strip of paper will be in contact while passing under the strips G′ G^2 and will be held together by them. The strip of paper thus folded and seamed will pass over a table, H, and thence between two cylinders I′ I^2, the latter of which is twice the size of the former, so that two bag blanks may be treated upon it while the cylinder I′ operates upon but one bag blank.

The cutter F is affixed to a cutter head which is mounted upon a shaft f' journaled in the side pieces of the frame A and having affixed to it a bevel gear wheel f^2. With this bevel gear wheel f^2 engages a bevel gear wheel f^3 mounted on a shaft f^4 journaled in bearings supported by one of the side pieces of the frame A. The shaft f^4 is provided with another bevel gear wheel f^5 which engages with a bevel gear wheel f^6 mounted upon a shaft I supporting the cylinder I′. The bevel gear wheel f^2 will preferably be adjustably connected to its hub so as to provide for properly arranging the time at which the knife will operate upon the strip of paper P. An adjustable connection may be afforded by providing the bevel gear wheel with an arc-shaped slot concentric with its axis, passing a screw

through this slot and engaging the screw with a tapped hole in the hub of the gear wheel. The shaft I is also provided with a gear wheel i', which engages with a gear wheel i^2 affixed to the shaft I^3 of the cylinder I^2. The shafts I I^3 of the cylinders I' I^2 are journaled in bearings affixed to the side pieces of the framework A. A creasing bar i^{14} is arranged upon the cylinder I' parallel with the axis of the latter and opposite in the cylinder I^2 is a corresponding recess. The office of this creasing bar is to crease the bag blank along the dotted line i^{15}, Fig. 6. On the cylinder I' are slitting knives i^3 which form the edges 1, 2, of the bag blanks. Opposite these slitting knives the cylinder I^2 will preferably be provided with recesses, so as to obviate the dulling of the edges of the knives. The slitting knives are set into recesses in the cylinder I' and preferably the latter will be provided with a number of recesses, so that the knives may be adjusted into positions for bag blanks of different sizes. The cylinder I^2 will have corresponding recesses. On the cylinder I' are needles i^4 for engaging with one of the side flaps p^2 of each bag blank just as the slitting knives i^3 begin to operate thereon. These needles pull the flap p^2 with which they engage away from the opposite flap p^2, the latter being still attached to the main portion of the paper strip and carried onward around the cylinder I^2. The needles i^4 are fitted in recesses in the cylinder I', and there may be different sets of recesses to afford provision for adjusting the needles for different sized bag blanks. Opposite the needles, the cylinder I^2 will preferably be provided with recesses to obviate dulling the needles. The act of pulling one of the side flaps away from the other causes the end flaps p^3 to be turned inward, as illustrated by Fig. 6. After the turning in of the end flaps p^3, the flap p^2 which has been pulled out by the cylinder I' will be disengaged from the needles i^4 of this cylinder by means of strippers J. These strippers, J, have forked and pointed extremities opposite which the cylinder I' is provided with circumferential grooves i^5. These strippers are mounted upon a rock shaft j journaled in bearings on the side pieces of the framework A, and, as they are clamped to the rock shaft by screws, they may be adjusted rotarily on the rock shaft. It will be seen that the collars fitting the rock shaft are provided with arms to which the strippers are fastened by screws. These screws afford provision for longitudinal adjustment of the strippers on the arms, if the strippers have longitudinal slots formed in them. After the end flaps have been turned in as described, the bag blank still connected to the strip of paper P passes along the under side of the cylinder I^2 and past a roller, K, which prevents the end flaps from turning out again, but does not press them down tight. This roller is mounted upon a shaft k, journaled in brackets k', which are longitudinally slotted and are clamped by screws k^2 to the side pieces of the framework A. Owing to this connection of the brackets k' with the side pieces of the framework A, provision is afforded for adjusting the roller K nearer to or farther from the cylinder I'. Next the bag blank is carried past a roller L, which is so close to the cylinder I^2 that it will press the end flaps down tight. This roller is mounted upon a shaft l journaled in bearings supported by the side pieces of the framework A.

M designates a pasting roller mounted upon a shaft m journaled in bearings supported by the side pieces of the framework A. This pasting roller has a pasting segment m', whose shape may be understood by reference to the dotted lines of Fig. 7, which indicate the paste applied by the segment to a bag bottom. Paste is applied to the pasting segment m' by means of a roller m^2 mounted upon a shaft m^3 journaled in brackets extending from the side pieces of the framework A. Paste is received by the roller m^2 from a roller m^4, mounted upon a shaft m^5 journaled in brackets m^6 extending from the side pieces of the framework A. The bearings for the shaft m^5 are adjustable along the brackets so as to vary the relation of the roller m^4 to the roller m^2. Screws m^7 engaging with tapped holes in the brackets and having a swiveling connection with the bearings of the shaft m^5 afford facility for making the adjustment. By adjusting the roller m^4 relatively to the roller m^2, the amount of paste delivered to the latter may be regulated, and moreover, any lumps in the paste may be disintegrated when a close adjustment is effected. The roller m^4 runs in a tank m^8 of paste, supported by brackets m^9 extending from the side pieces of the framework A. After the pasting is done, the bag blanks are carried forward by means of belts n which pass around the pasting roller or pulleys affixed to its shaft. These belts also travel adjacent to the cylinder I^2 and pass around other rollers. The bag blanks having been pasted, are next subjected to the action of a creaser bar O, carried by an arm o affixed to a shaft o', which is journaled in bearings supported by the side pieces of the framework A. This creaser bar forms a crease along the dotted line o^2 in Fig. 6 to facilitate the folding over of the bag blank there. This creaser bar may be adjusted lengthwise of the arm o, if provided with suitable slots where the fastening screws o^3 pass through it. The hub of the arm o, if clamped in the ordinary manner by screws to the shaft o', may be adjusted rotarily thereon. On the shaft o' are pulleys o^4 around which the belts n pass. Next the bag blanks are subjected to a knife Q, whereby the side flap p^2, which is still connected to the strip of paper, P, will be severed. This knife is carried by arms q extending from collars fastened to a shaft q' journaled in bearings supported by the side pieces of the framework A. Obviously, if the collars of the arms q are secured to the shaft q' by clamping screws in the ordinary manner, pro-

vision will be afforded for adjusting the knife Q rotarily of the said shaft, and, if the set screws q^2 which fasten the knife to the arm q pass through suitable slots in the knife, provision will be afforded for adjusting the knife radially to the shaft q'. On the shaft q' are pulleys q^3, around which the belts n pass. Next the bag blanks are subjected to the action of a creaser bar R fastened by screws r to an arm r' having a collar which fits upon a shaft q'. If clamping screws are employed in the ordinary manner to fasten the collar to the shaft, provision will be afforded for rotary adjustment, and, if the screws r pass through suitable slots in the creaser bar, provision will be afforded for adjusting the latter lengthwise of the arm r'. This creaser bar creases the bag blanks along the dotted line r^2, Fig. 6, to facilitate the folding of the bag blank there. The side flaps p^2 are now folded over along the dotted lines $o^2 r^2$, Fig. 6. This is done by means of a folder, S, consisting of a rod extending across the cylinder I^2 parallel with the axis of the latter. This rod is supported by an arm s hung loosely upon the shaft I^3 of the cylinder I^2 and pivotally connected with the cam rod s' having a stud or roller s^2 that co-acts with the cam s^3 affixed to the shaft m carrying the pasting segment. A spring s^4 fastened at one end to the arm s and at the other end to one of the side pieces of the framework A, maintains the stud or roller s^2 in contact with the cam s^3. It will be understood that the cam s^3 oscillates the cam s in one direction and that the spring s^4 moves the arm in the opposite direction as permitted by the cam. The cam s^3 is so shaped that the folder rod S will first obtrude itself in the way of the forward flap p^2 of each bag blank, and having raised that from the surface of the cylinder I^2 into the position indicated in Fig. 8, rapidly moves backward or in the direction the reverse of that in which the cylinder I^2 is moving until it reaches a position in rear of the other side flap p^2. It is in the latter position that Fig. 8 represents it. After reaching this position, it quickly moves forward again so as to fold over this side flap. By this time, the forward side flap p^2 is just about passing under a pressing roller T, and consequently the forward side flap will be folded over upon the rear side flap. The paste previously applied will then unite the side flaps. The pressing roller T presses all the parts firmly together. It will be seen that this pressing roller is mounted upon a shaft t journaled in bearings supported by brackets extending from the side pieces of the framework A. These brackets preferably have housings to which the bearings are fitted, and screws are employed to adjust the bearings within the housings to vary the pressure with which the roller T operates. The belts n pass around the pressing roller T. The completed bags are engaged by a guide U and carried up over the pressing roller T to a stripper or guide plate V, whence they pass to belts W and are carried away. The belts W pass around guide rollers w journaled in brackets extending from the side pieces of the framework A.

Motion is imparted to the several rollers from the driving gear S' which meshes with the gear i' of the roller I'. The gear i' meshes with the gear i^2 of the roller I^2 and this engages with a gear s' on the shaft of the roller L, and a band s extends from a pulley in this gear to the shaft of the roller K. The gear i^2 also engages with a gear s^3 of the paster M, a gear s^4 for the creaser D and a gear s^5 on the shaft q'. The paste rollers m^2 m^4 are driven from the gear s^3 by means of gears s^6 s^7.

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

1. In a machine for making paper bags, the combination of a folder for causing the folding of a strip of paper laterally, a cutter for making an incision in the paper, cylinders wholly independent of the cutter for separating the ends of bag blanks and folding devices arranged around one of said cylinders, substantially as specified.

2. In a machine for making paper bags, the combination of a folder for causing the folding of a strip of paper laterally, a cutter for making an incision in the paper, cylinders wholly independent of the cutter for separating the ends of bag blanks, one of said cylinders having co-acting belts for holding the bag blank flat and the other having needles for engaging one side of the bag blanks, and folding devices arranged around one of said cylinders, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. LIDDELL.

Witnesses:
OWEN E. ABRAHAM,
WM. A. POLLOCK.