

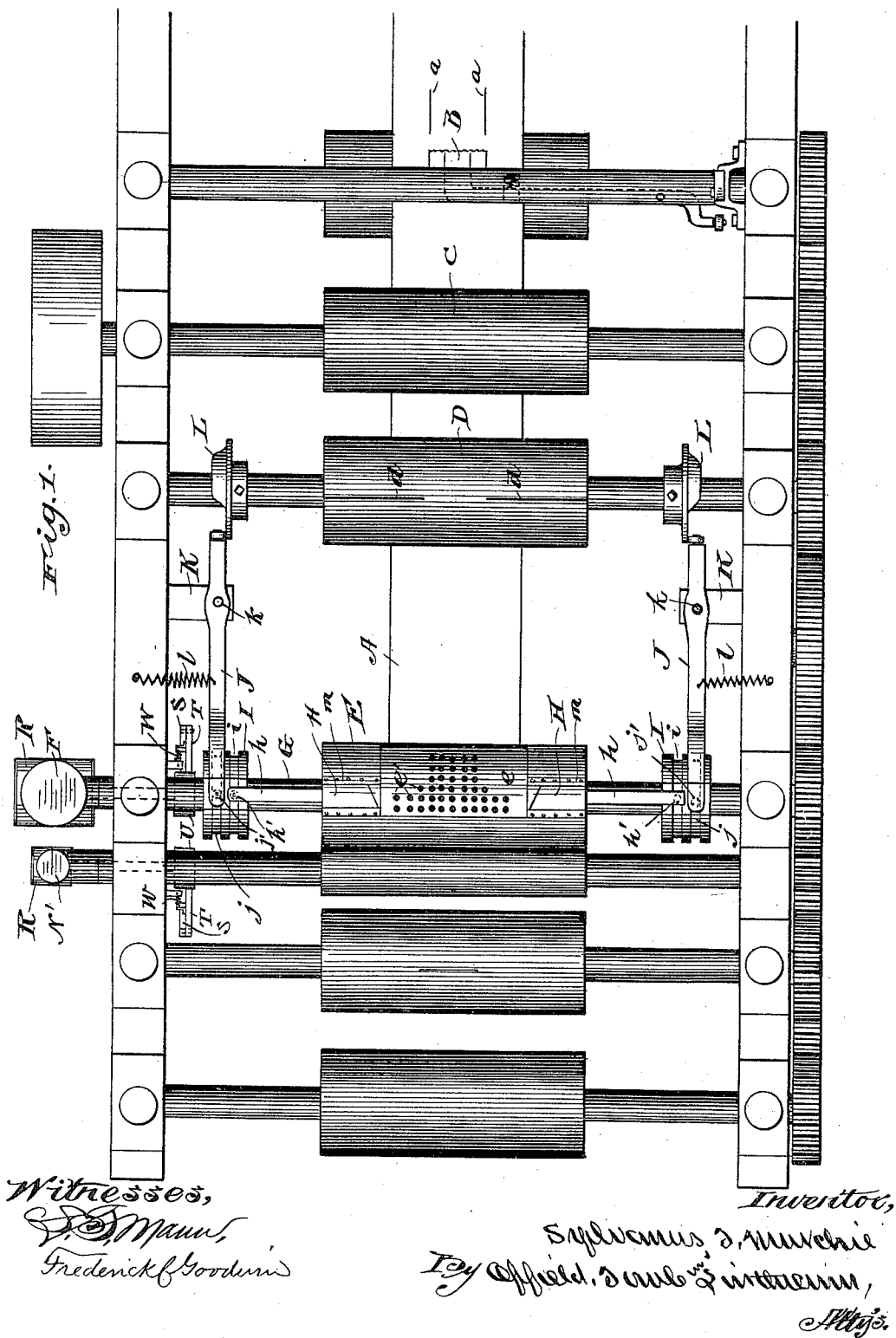
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S. T. MURCHIE.
PAPER BAG MACHINE.

No. 585,280.

Patented June 29, 1897.



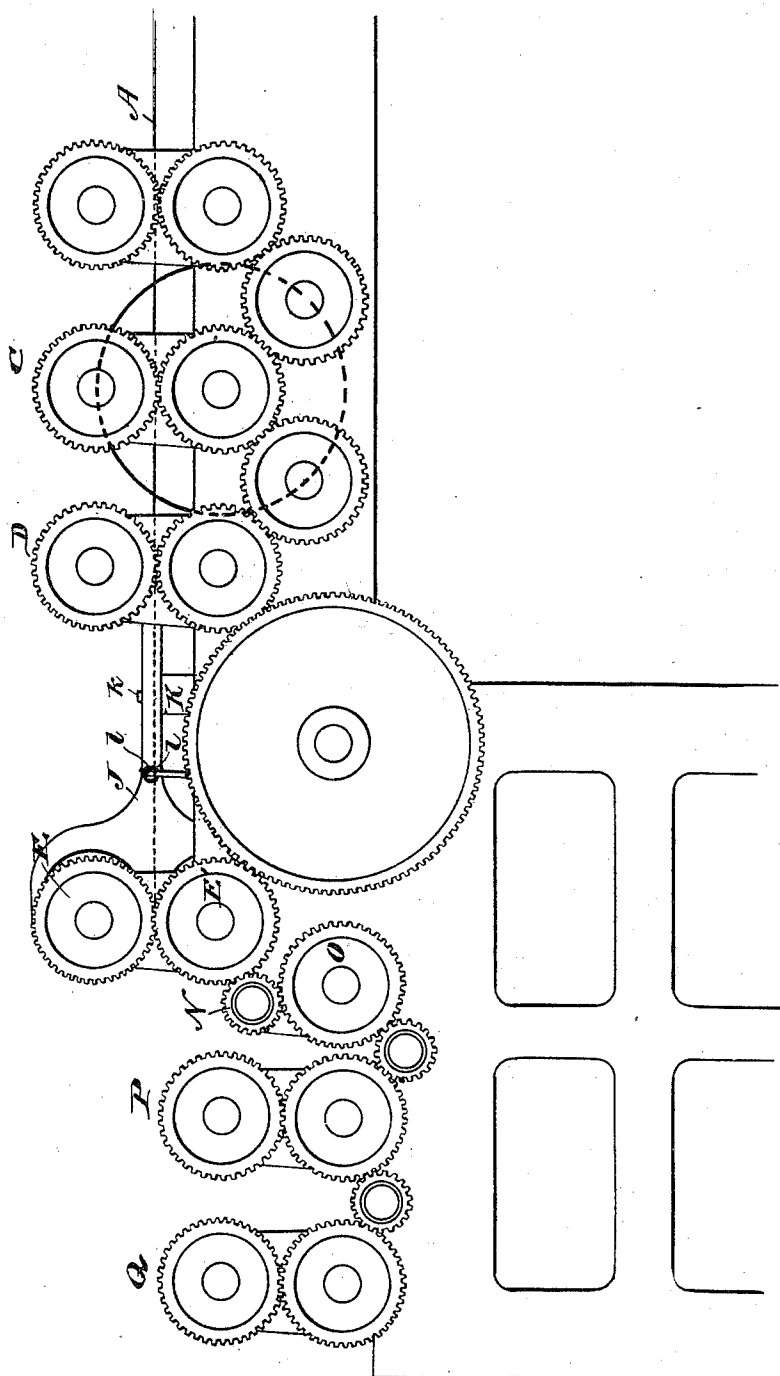
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Frederick Goodwin

Inventor,
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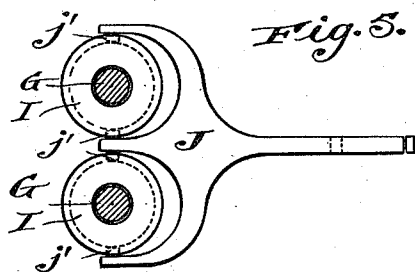
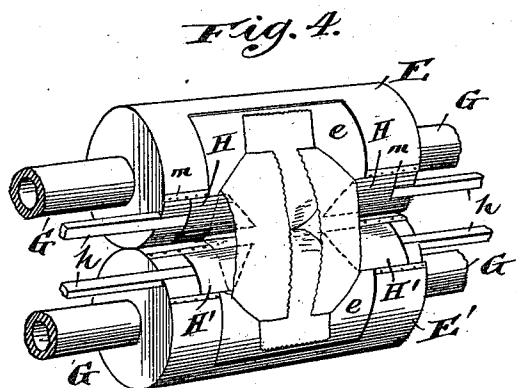
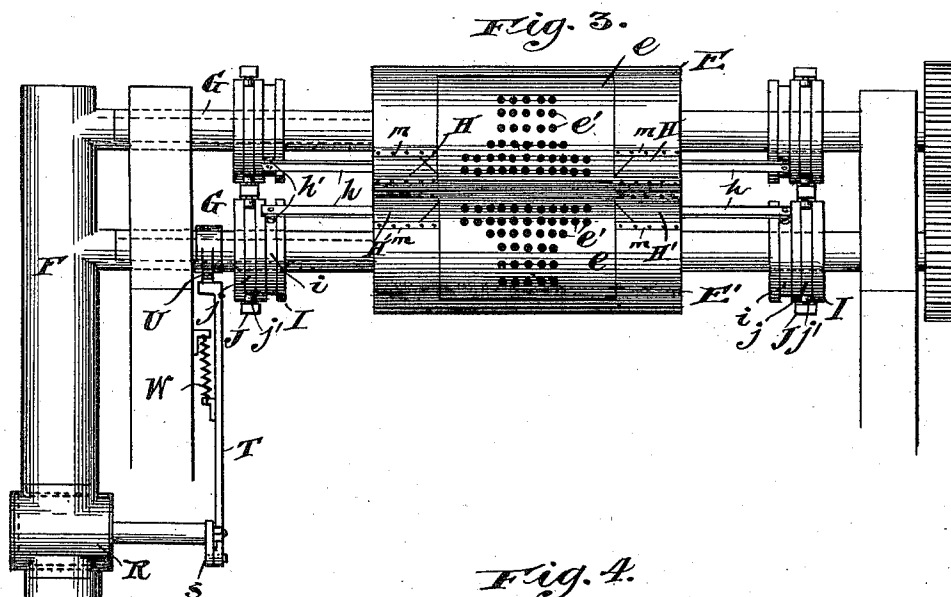
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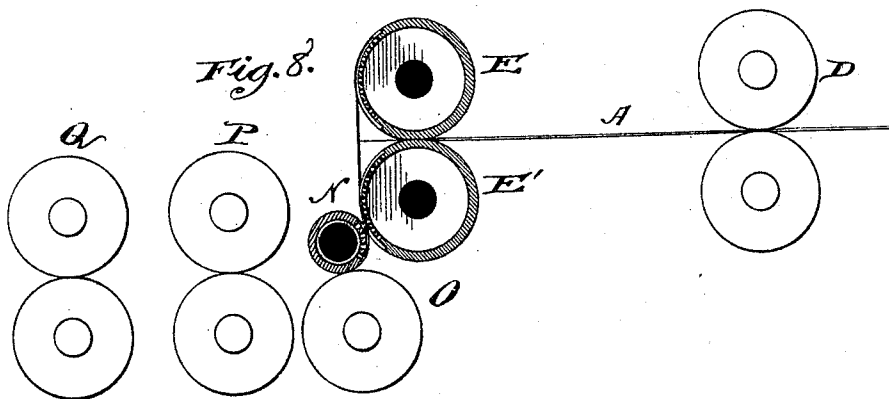
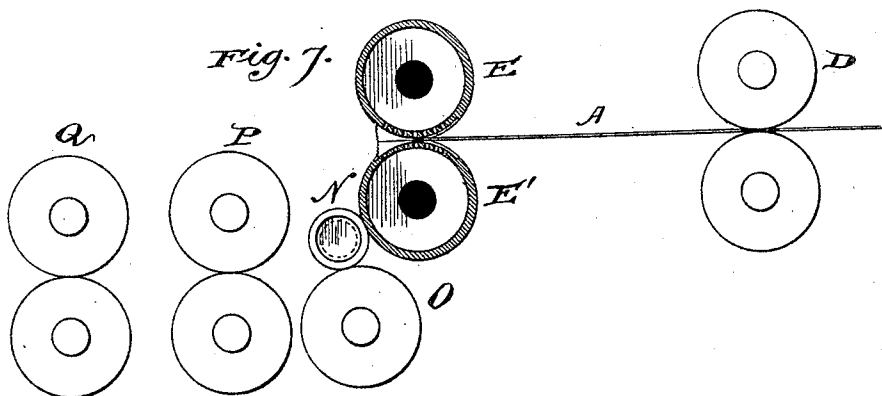
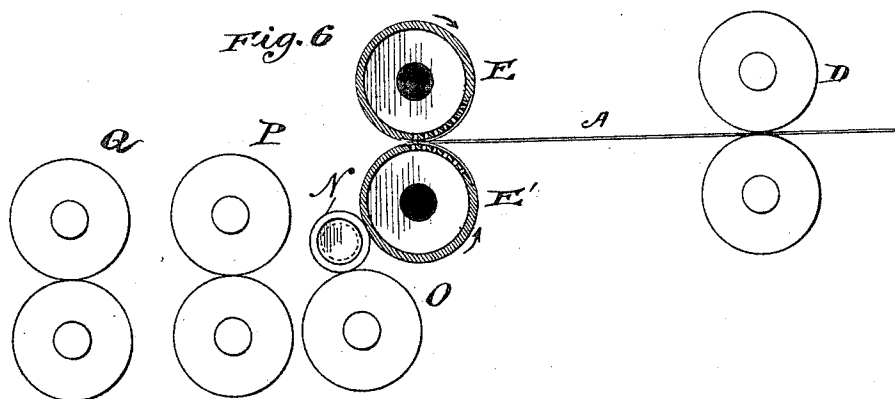
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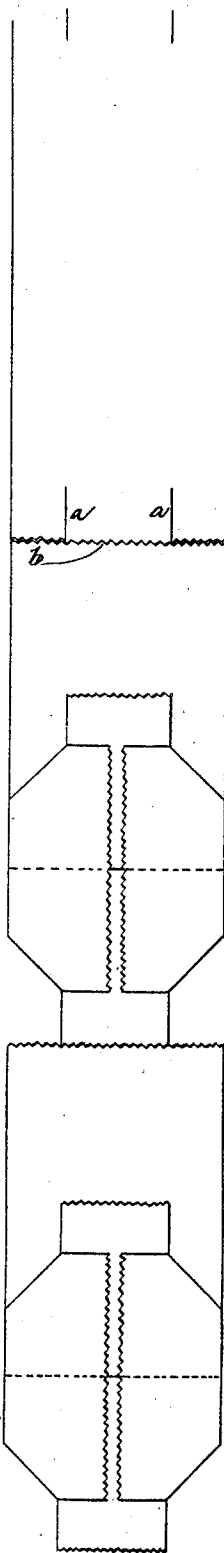
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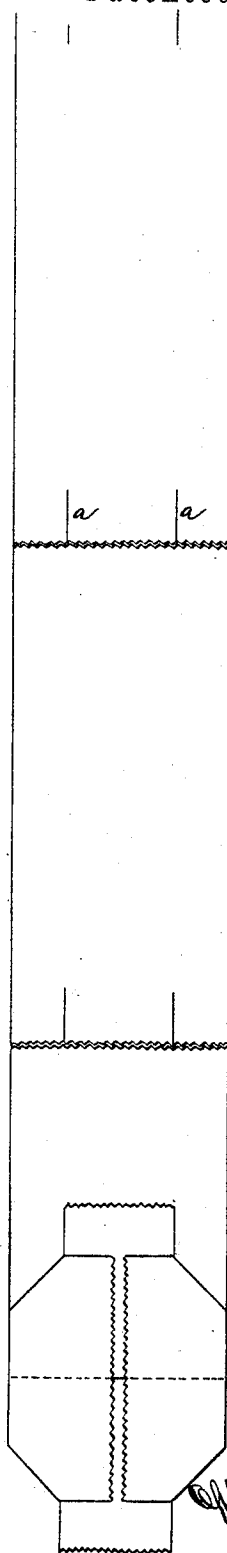
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Fig. 9.



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Fig. 10.



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UNITED STATES PATENT OFFICE.

SYLVANUS T. MURCHIE, OF BATAVIA, ILLINOIS, ASSIGNOR TO THE WESTERN PAPER BAG COMPANY, OF SAME PLACE.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,280, dated June 29, 1897.

Application filed October 19, 1896. Serial No. 609,312. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS T. MURCHIE, of Batavia, Illinois, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

This invention relates to machines for making paper bags, and more particularly, first, to pneumatic means for opening the leading end of a flat tube of paper having tucked-in sides or bellows folds; second, to the combination, with said pneumatic means, of laterally-operating blades or fingers for holding the tube at points corresponding to the corners of the bag-bottom, which is produced by the folding operation.

In my Patent No. 540,556, of June 4, 1895, I have shown a paper-bag machine having what are therein denominated "suction-boxes," said suction-boxes consisting of hollow bodies of rectangular form perforated upon their adjacent faces and hinged at their edges with cooperating mechanism adapted to rock said suction-boxes upon their axes for the purpose of separating their proximate faces and thereby separating the sides of the flat tube adhering to such faces by reason of the suction. In the operation of the machine of said patent the forward movement of the blank is interrupted during the separation of the suction-boxes and the capacity of the machine is limited to the extent of the time occupied by this operation.

The principal object of my present invention is to provide a paper-bag machine in which the leading end of the tube is opened pneumatically or by suction without any loss of time whatever.

To this end my invention consists, first, in rotary suction-formers; second, in the combination, with said rotary suction-formers, of laterally-movable devices which define the corners of the bag-bottom and over which the paper is stretched by the pneumatic action, and, third, in certain other devices and combination of devices, as hereinafter described, and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan, and Fig. 2 a side elevation, of that

portion of a paper-bag machine in which the bottom folds are defined, formed, pasted, and pressed. Fig. 3 is a front elevation of the rotary suction-formers, showing also the laterally-moving blades or fingers and the means for moving them. Fig. 4 is a perspective view of the rotary formers, showing the end of the tube opened with the fingers or blades thrust into the tucked-in side or bellows folds and the side folds of the bag-bottom in the process of formation. Fig. 5 is a detail view showing the suction-roll shafts in section and certain grooved collars mounted thereon in elevation with a portion of a mechanism for operating the blades. Figs. 6, 7, and 8 are diagrammatic views showing three stages of the operation—namely, the entry of the tube between the rotary suction-formers, the beginning of the opening of the end of the tube and the completely-opened position, and also the action of the supplementary suction-roll for removing the blank from the suction-formers. Figs. 9 and 10 show plan views of blanks, the former view showing a series of connected blanks and the latter severed blanks.

As my invention relates entirely to the means for opening the end of the flat tube and producing the necessary folds therein to form the bottom of the bag, I have not fully illustrated and shall not describe in detail the various mechanisms for forming, slitting, and severing the tube and for pasting and delivering the bag. Means for performing these operations may be such as are already well known, and the particular features of my invention may be associated with or adapted to machines the construction and operation of which are well known.

The tube is marked A, and it is lead from the tuber-head beneath a vibrating knife B, by which the upper side of the tube is transversely severed through that portion bounded by the two previously-formed longitudinal slits or incisions, (indicated at *a*, the transverse cut being indicated at *b*.) From the knife the paper passes between feed-rolls (indicated at C) and is delivered to the knife-rolls D. The upper member of said pair of rolls D is provided with longitudinal knives

d, which will be of such length as to sever the sides of the tube transversely, leaving the lower side of the tube unsevered between the longitudinal incisions *a*, thus providing a tongue or ligament connecting the blanks together, as shown in Fig. 9. The series of connected blanks then pass to the suction rolls or formers, (marked E E'.) Said rolls are hollow cylinders and have peripheral depressions through about one-fourth of their circumference, such depressions being indicated at *e*. Within such depressed portions are located transverse apertures or perforations *e'*, which are arranged in a manner to cover the bag-bottom at that stage in the formation thereof prior to the last two folds. The interior of these cylinders or rolls may be exhausted through the pipe F, communicating through hollow journals or roll-shafts G, and suitable valves will be provided in the air-passages, so as to cut off the flow of air at proper intervals.

II H' represent sliding blades or plates mounted upon stems *h*, which stems carry rolls *h'*, traveling in grooves *i* of collars I, secured upon the shafts G. Said collars have a second set of grooves *j*, in which travel rolls *j'*, carried upon the fulcrums of shifting levers J. Said levers are pivoted at *k* to the bracket K and are vibrated upon their pivots by means of the cams L, carried by the shaft of the knife-roller D. A spring *l* normally holds the ends of the levers J in contact with the face of the cam-disk. The stems *h* slide in suitable ways longitudinally of the periphery of the rolls E E', and the bodies of the blades are curved transversely to the contour of said suction-rolls, with their edges beneath the plates *m*.

By reference now to Figs. 6, 7, and 8 the operation of the suction-rolls will be understood. In Fig. 6 the blank is seen as entered between the suction-rolls, the ends of the blank being engaged between the surfaces of the rolls opposite the first row of perforations. Supposing the interior of the cylinders to be then exhausted, the suction will operate upon the sides of the tube, causing such sides to adhere to the surfaces of said rolls over the perforations therein, and as the rolls rotate in the direction of the arrows of Fig. 6 the bag-blank will be carried forward, while the free portions of the tube defined by the longitudinal cuts *a* and the transverse cut *b* will be caused to adhere tightly to the rolls, together with that portion of said sides immediately in the rear of said free flap. As the separation of the sides proceeds the blades are moved inwardly, their pointed ends entering the tucked-in sides or bellows folds of the tube. Before the tube is fully opened said blades have entered to the position shown in Fig. 4. The side folds, by which is meant those portions of the bag-bottom whose free margins are drawn into parallelism by the opening of the tube, are produced by the combined action of opening of said tube, while

those portions adjacent to said folds tightly adhere to the surface of the formers, the blades furnishing points of resistance over which the stretching or folding action takes place, said blades serving to set or hold the tube at the four points and defining the corners of the bag-bottom. It will be understood, however, that the blades do not mechanically break down or crease the paper and that their form may be considerably varied. As shown, they are substantially triangular in outline, but they may be of the form shown in my application, Serial No. 555,838, filed July 13, 1895. The series of connected blanks may pass from the suction-formers between a pair of feed-rolls of any preferred construction. I have shown a pair of feed-rolls N O, the former being much smaller in diameter than its fellow, and from said feed-rolls the blanks may pass to the pair of paste-rolls P and the final fold-rolls Q.

One of the paste-rolls may carry a knife to sever the ligament or connecting-strip of the series of blanks.

My machine is adapted for operation in the manufacture of paper bags where the blanks are severed prior to their delivery to the suction-rolls, and in such cases some provision must be made for taking the partially-completed bag from the rotary suction-former rolls and transferring it to the paste-rolls. Such provision is shown in Fig. 8, the roll N being perforated and connected with an exhaust-pipe N', whereby its interior may be exhausted and the flap or leading fold of the bag may be caused by suction to adhere to the surface of such roll, whereby the blank will be withdrawn from the suction-formers and passed onto the paste-rolls. The air-exhausting mechanism will cut off the air from the forming-rolls E E' at the instant the tube is fully opened, and simultaneously with the cutting off of the current from the main rolls the roll N will be exhausted, thus causing the flap to adhere to its surface until the bag is fully grasped by the rolls N O, whereupon the air will be cut off from said feed-roll.

I have shown in Figs. 1 and 3 a valve R for controlling pipe F, the valve-stem carrying a crank-arm S, to which is connected a lever T, projected into the path of a striker U of the shaft G. A spring W holds the lever in the path of the striker, and the latter is so positioned on the roller as to turn the valves at the proper times. A similar mechanism is indicated in Fig. 1 as applied to the pipe N'.

I claim—

1. In a paper-bag machine the herein-described means for opening the leading end of the paper tube consisting of hollow rotary formers having perforated portions and adapted by their rotation to separate the sides of the tube and thereby open its leading end, substantially as described.

2. In a paper-bag machine the combination with rotary suction-formers of laterally-reciprocating blades or holders adapted to impinge

the sides of the tube and define the corner folds thereof, substantially as described.

3. In a machine for making satchel-bottom bags from flat paper tubes having bellows folds the combination with a pair of rotating hollow cylinders having perforated portions, of means for exhausting the interiors of said cylinders and laterally-moving blades mounted to slide upon the peripheries of said rolls and to enter the bellows fold of the tube and thereby assist in the formation of the side laps of the satchel-bottom, substantially as described.

4. In a paper-bag machine the combination with rotary cylinders having perforated portions, longitudinal ways in the surfaces of said cylinders, blades adapted to reciprocate in said ways, means for intermittently ex-

hausting the interiors of said cylinders, and means for operating said blades.

5. In a paper-bag machine the combination with two hollow rotary cylinders having circumferential depressions, perforations in said depressed portions, means for exhausting the interiors of said cylinders and laterally-moving blades adapted to cooperate with said cylinders in the formation of a bag-bottom, substantially as described.

6. In a paper-bag machine the combination with rotary suction-rolls and laterally-moving blades of a delivery-roll operating also by suction, substantially as described.

SYLVANUS T. MURCHIE.

Witnesses:

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