2 Sheets—Sheet 1.

W. C. CROSS.

Paper-Bag Machine.

No. 221,529. Patented Nov. 11, 1879.

Fig. 1.

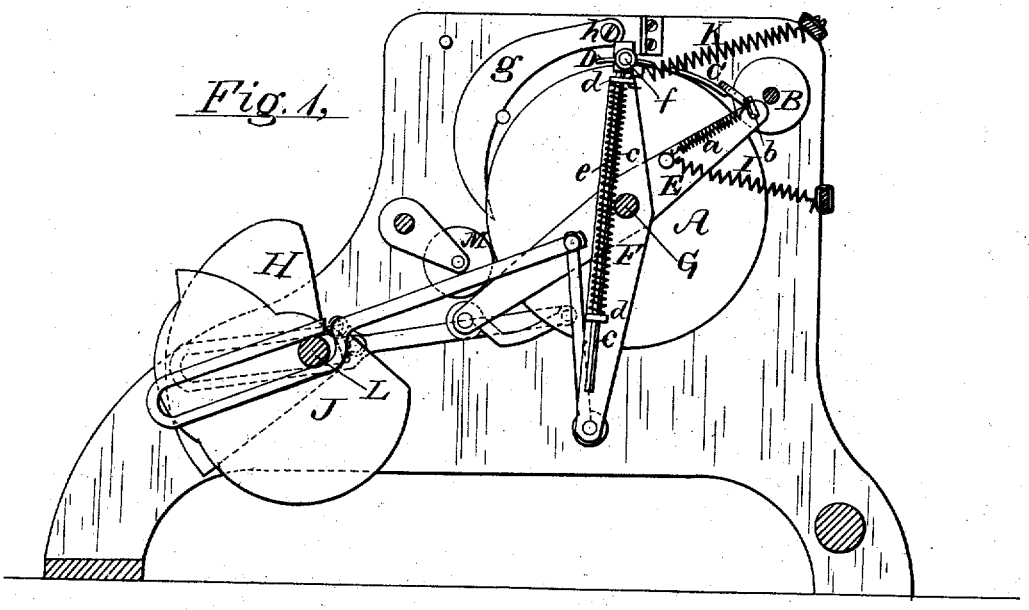
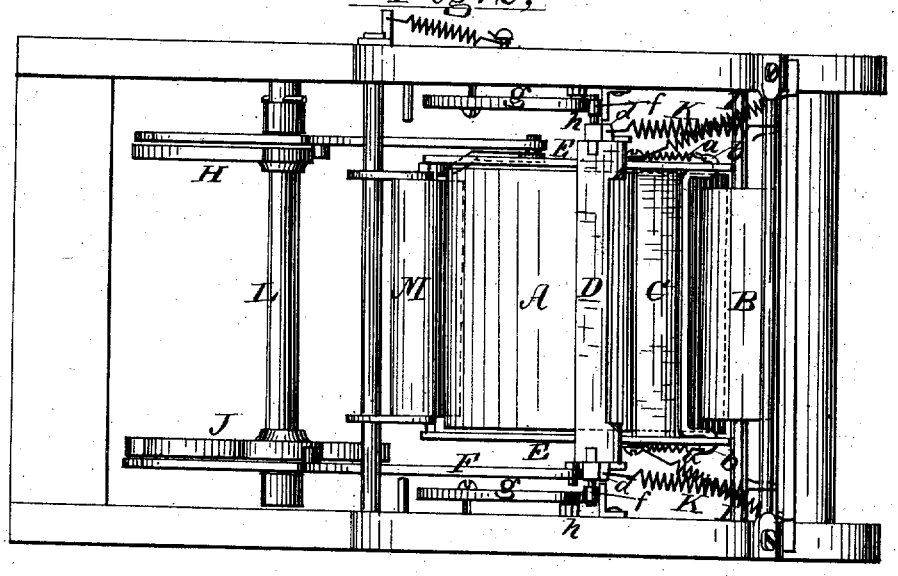


Fig. 2.



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Inventor:
William C. Cross,
by Thos. Bailey
his Atty.

2 Sheets—Sheet 2.

W. C. CROSS.

Paper-Bag Machine.

No. 221,529. Patented Nov. 11, 1879.

Fig. 3,

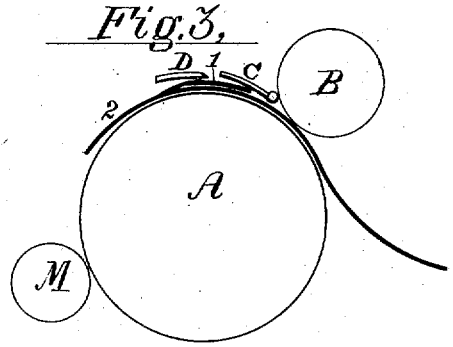


Fig. 4,

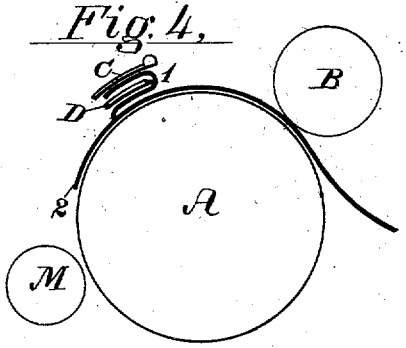


Fig. 5,

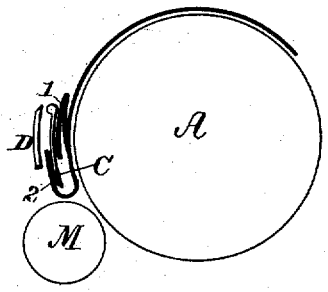
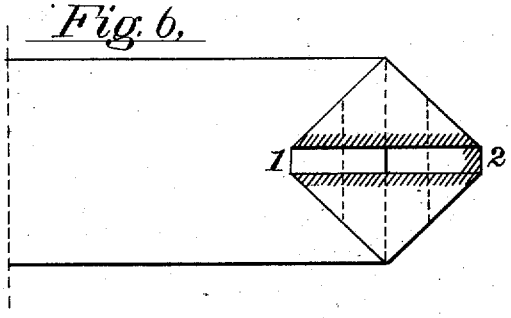


Fig. 6,



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UNITED STATES PATENT OFFICE.

WILLIAM C. CROSS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **221,529**, dated November 11, 1879; application filed September 12, 1879.

To all whom it may concern:

Be it known that I, WILLIAM C. CROSS, of Boston, Massachusetts, have invented certain new and useful Improvements in Machinery for Making Paper Bags, of which the following is a specification.

My invention relates to machinery for making satchel-bottom paper bags, and has particular reference to mechanism designed to make the second and third folds—that is to say, the two folds required in order to complete the satchel-bottom after the first or diamond fold has been formed. It is my object to make and complete these two folds while the blank is in motion, and without interfering with its continuous passage through the machine.

The mechanism in which my present invention is involved takes the blank after the diamond fold, by any suitable means whatever, has been formed thereon, and it then folds the end flaps of said diamond fold to make the second and the final folds.

The blank with the diamond fold formed thereon is fed to a revolving cylinder, with which it moves, and is there acted on successively by devices which I term the "second" and "third" folders, both of which are plates or equivalent instrumentalities, which act together to make each fold. The third folder first clamps the blank, and serves as a guide over which the second folder acts to turn the second fold. The second folder then in turn clamps the blank, and serves as a guide over which the third folder acts to turn the third or final fold. Each device is thus alternately a clamp and guide and a folder. Each, when acting as a clamp, moves synchronously with the cylinder, and when acting as a folder moves faster than the cylinder; and each has at proper times a movement to and from the cylinder, so that when acting as a folder it may pass over or above that one which acts as a clamp and guide.

The nature of my invention and the manner in which the same is or may be carried into effect will be understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a machine embodying my invention. Fig. 2 is a plan of the same. Figs. 3, 4, and 5 are diagrams of the bag and the folders in the different positions hereinafter referred to. Fig. 6 is a plan of the blank with the diamond fold formed therein, showing how the paste is applied.

A is the cylinder, between which and the roll B the blank with the diamond fold formed therein passes, with the diamond fold uppermost. The cylinder rotates at a regular speed, determined by circumstances. When used with machinery for making the first or diamond fold it will revolve at a speed to take properly the blanks delivered from that machinery—such machinery, for instance, as described in another application in my name for Letters Patent executed of even date herewith, and filed in the United States Patent Office on or about August 30, 1879, in which I have shown machinery for making the first or diamond fold without interfering with the regular and continuous feed of the tube from which the blanks are cut.

The blank fed along between the roll B and the cylinder A moves with the cylinder toward the folding mechanism, the two essential members of which are the second folder, C, and the third folder, D. Each folder is a plate, which extends across the cylinder, and is mounted on a vibratory or oscillatory frame, whose axis of motion is coincident with the axis of the cylinder.

The frame of the second folder is shown at E, mounted so as to oscillate on the cylinder journals or shaft G. The third folder-supporting frame is shown at F, mounted so as to be capable of freely oscillating on the shaft G. Each frame is independent of the other.

The movements of frame E are controlled by cam H and spring I, which acts against the cam. The movements of frame F are controlled by cam J and spring K. Both cams are fixed on one and the same power-driven shaft L.

The second folder, C, is hinged or jointed to its frame E, so that its front edge may rise and fall to and from the cylinder; and this edge is held down upon the cylinder with a

yielding pressure by springs *a*, attached to crank-arms *b* on the journal-studs of the hinged folder C.

The third folder, D, is united, also, with its supporting-frame F by a yielding connection, which, however, is so arranged as to allow the folder to bodily rise and descend. This connection is made by means of rods *c*, to which the folder is fastened, and which pass through ears *d* in the frame F loosely, or so as to be capable of up-and-down movement. The rods are pressed downward by means of springs *e*, which serve to hold the folder D against the cylinder with yielding pressure.

At each end or side of the folder D is a laterally-projecting stud *f*, said studs being designed to act in connection with switch-cams *g*, pivoted at *h* to the machine-frame, so that when the third folder moves forward they may rise to permit the studs *f* to pass freely below them. As soon, however, as the studs move forward far enough to pass or clear said cams the latter drop, and, consequently, when the third folder returns its studs must, when they meet the cams, ride over the upper faces of the same. The third folder is thus lifted, and remains elevated until its studs pass back beyond the heels of the cams, at which time the recoil-springs *e* bring the folder-blade D down again upon the cylinder.

The movements of the parts just described are as follows, it being understood that the cams are so shaped and positioned as to produce said movements in connection with the reaction-springs I K.

When the two folders are in the position shown in Fig. 3, the blank with diamond fold uppermost, and traveling with the cylinder A, has reached the position indicated in the figure. It arrives at this point just as the third folder has dropped upon the cylinder. In this position, as shown, the rear edge of the third folder is on the line over which the rear flap, 1, of the diamond fold is to be turned to make the second fold, the rear flap still lying partly under the second folder, C. The third folder, D, thus clamping or resting on the blank, now moves with the cylinder and blank, while the second folder, C, remains at rest until the rear point of flap 1 has passed beyond it. As soon as this has been done the second folder, C, moves quickly forward, its front edge going beneath flap 1, and turns this flap over, as indicated in Fig. 4, the folder C being over the folder D, with the flap between them. The second folder, C, now moves with the cylinder, while the third folder moves rapidly out from under the second folder, and far enough forward to pass beyond the front point or flap, 2, of the diamond fold to the position indicated in Fig. 5. Reaching this position, it returns (the second folder still moving forward with the cylinder) and turns up and back the flap 2 to make the last fold. The second folder, C, has by this time moved along with the cylinder far enough to tuck the final fold in between the cylinder and the roll M, which presses down the fold and delivers the completed bag. At the same time the second and third folders return rapidly to their original positions to take a fresh blank.

Paste can be applied in any suitable way. Preferably, paste is applied to the blank before it reaches the cylinder, as shown in the blank in Fig. 6, the shade-lines indicating the paste.

The folders can, if desired, be cut away at the points where they would otherwise come in contact with the lines of paste.

It is manifest that various mechanical devices may be used to obtain the specified movements of the folders, and also that the movements may be wholly positive, and not dependent in part on spring action.

It is also manifest that an endless belt, moving regularly in one direction, would be the mechanical equivalent of the cylinder, and that the second and third folders could readily be arranged to operate in connection with said device.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In machinery for making the second and final folds of satchel-bottom bags, the combination, substantially as hereinbefore set forth, with a cylinder revolving continuously in one direction, of second and third folders, arranged and operating substantially as shown and described, to act alternately as folders and as clamps and guides, the one acting as a clamp and guide for the line of fold when the other acts as a folder.

2. In combination with the continuously-rotating cylinder upon which the bag-blank with diamond fold is received, the oscillatory second and third folders, arranged to move concentrically with the cylinder and also to and from the periphery of the same, and operating mechanism whereby they are caused to move relatively to one another and the cylinder, substantially as described, to make the second and third folds while the blank is moving with the cylinder.

3. In combination with the rotating cylinder and the oscillatory second and third folders, arranged and operating in connection with the cylinder, as hereinbefore specified, the final delivery-roll between which and the cylinder the final fold of the blank is tucked by the second folder, substantially as hereinbefore shown and set forth.

In testimony whereof I have hereunto set my hand.

W. C. CROSS.

Witnesses:
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M. GEORGII.