2 Sheets—Sheet 1.

W. C. CROSS.
Paper-Bag Machine.

No. 221,531. Patented Nov. 11, 1879.

Fig. 1,

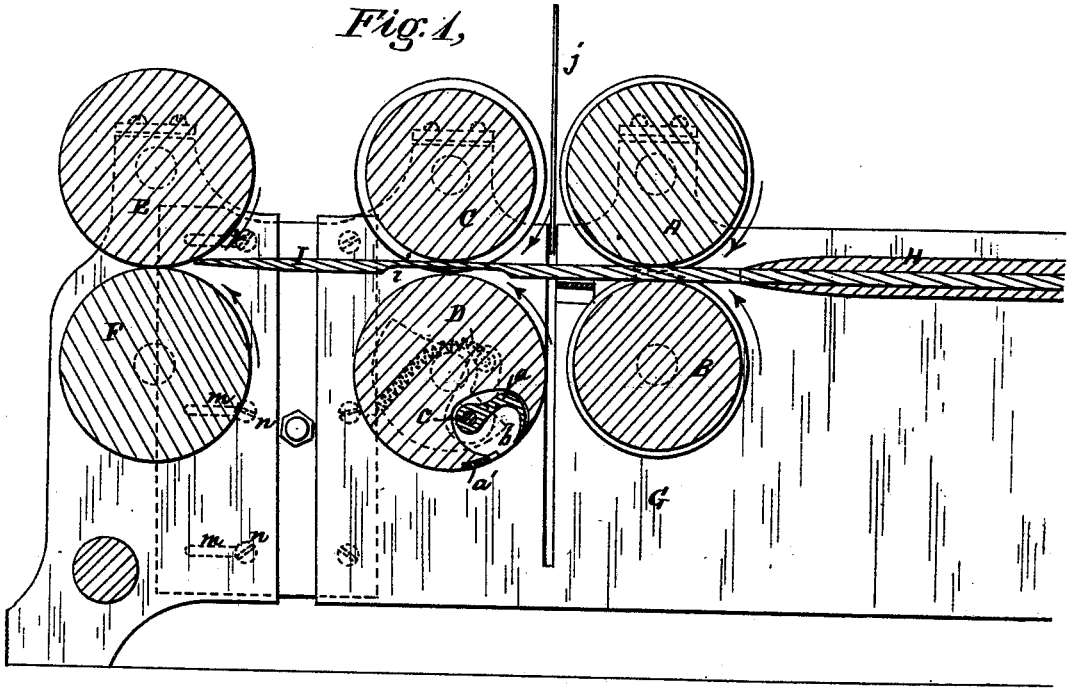
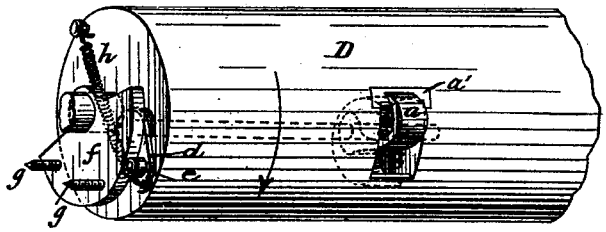


Fig. 2,



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Inventor:
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Paper-Bag Machine.

No. 221,531. Patented Nov. 11, 1879.

Fig. 3,

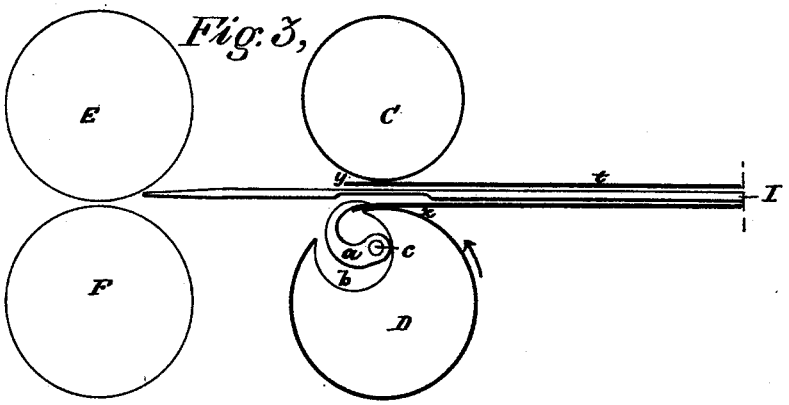


Fig. 4,

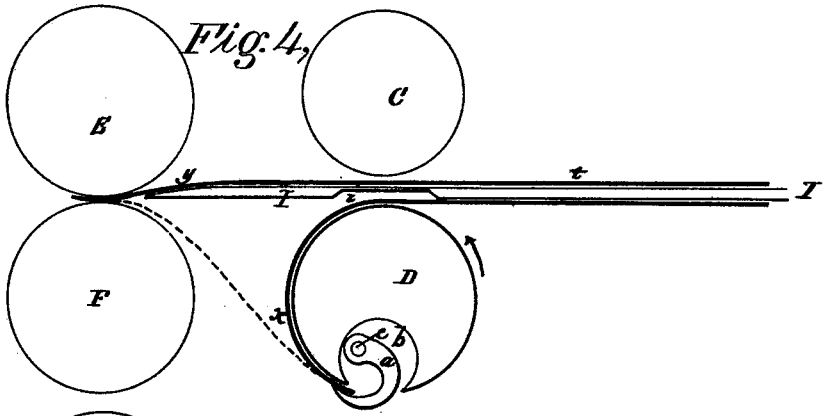
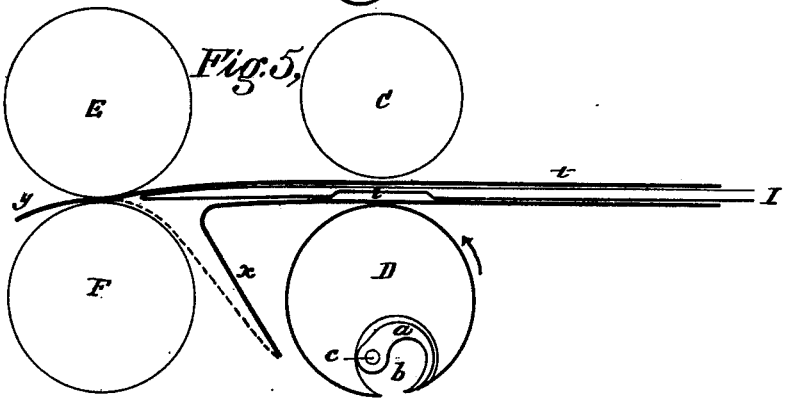


Fig. 5,



Witnesses:
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Inventor:
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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. **221,531**, dated November 11, 1879; application filed September 27, 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 is directed to machinery for manufacturing square or satchel bottom paper bags, and has particular reference to mechanism for making what is termed the "first" or "diamond" fold.

It is my object to make this fold while the paper tube or blank is in motion, in such manner as not to interfere with the continuous forward movement of the blank or tube. It is also my object to effect this result by the employment of cylinders or rolls which continuously rotate in one direction, instead of making use of reciprocatory or vibratory devices, such as have hitherto been employed for the purpose.

To this end I feed the blank or tube between continuously-rotating rolls, which carry forward the said tube, and on or in one of the rolls I mount a nipper or its equivalent, so formed and arranged that at proper times it will first take hold of that ply of the tube or blank next the nipper-roll and hold it so as to cause it to rotate with said roll, and then release said ply after it has been drawn back the proper distance to make a diamond fold of the requisite dimensions. The other ply of the tube I uphold by means of a longitudinal guide-bar which is within the tube or blank and extends in the line of feed. The tube or blank is fed along upon this guide-bar, while the ply that is engaged by the nipper-cylinder is drawn back.

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

Figure 1 is a longitudinal vertical central section of so much of a paper-bag machine as is needed in order to illustrate my invention. Fig. 2 is a perspective view of the nipper-cylinder. Figs. 3, 4, and 5 are diagrams representing the parts in the various positions which they assume during the formation of the diamond fold.

The various working parts of the machine are supported in a suitable frame, G.

I make use, in order to produce the tube from which bag-lengths are cut, of a trunk or former, H, around which the paper tube is formed in the usual way—that is to say, a sheet or ribbon of paper of proper width is conducted to and folded around said former or trunk and pasted along its overlapping edges.

The instrumentalities for making the tube are well known and in general use and require no further explanation.

Attached to the front of the trunk or former H is the guide bar or rod I, which is a narrow metallic strip, extending between the feed and nipper rolls or cylinders A B and C D and up to the delivery-rolls E F. All of these rolls revolve at the same peripheral speed and are preferably geared together, so as to move positively.

The rolls A B are the feed-rolls proper. They draw forward the tube which is formed on the trunk H, and are grooved centrally for the passage of the guide bar or rod I. In advance of the feed-rolls A B are the two rolls C D, which also act to feed forward the blank or tube. One of the rolls—in this instance the lower one, D—carries the nipper or jaw or equivalent device to engage the adjoining ply of the blank, as hereinbefore mentioned. This device consists in the present instance of a hook-like jaw or nipper, *a*, which is hung in a recess, *b*, in the cylinder or roll D on rock-shaft *c*, supported in proper bearings in the cylinder, and provided at one end with a radial arm, *d*, from which projects a crank-pin or roller-stud, *e*. This roller-stud *e* travels over the periphery of a cam, *f*, which, by screws *g* or other suitable devices, is fixed to the frame G of the machine. A spring, *h*, holds the stud *e* against the periphery of the cam.

The parts are so arranged that when the cylinder is in rotation the rock-shaft is operated by the cam to cause the nipper fastened on said shaft to alternately move out of its recess, so that its beak will move forward and rest on the bed-plate or stationary jaw *a'* of

the cylinder, and then, after a proper interval, retire again to its position within the cylinder.

The nipper rises or moves out from its recess as it is passing under the guide-rod I, and to permit this movement the rod is recessed, as indicated at *i*, which leaves an opening between the guide and the under ply, through which the beak or point of the nipper can enter.

In advance of the nipper-cylinder and its fellow roll are the two rolls E F, which I term the "delivery-rolls." These rolls take the blank by the front point of the partly-formed diamond fold, and carry the blank along, the diamond fold being pressed and completed in its passage between said rolls. These rolls deliver the blank to the subsequent mechanisms for making the second and final folds needed to complete the satchel-bottom, or they form part of such mechanism. They are here shown simply with a view to indicate how the blank is to be taken from the nipper-cylinder and its fellow roll by any suitable mechanism that is to subsequently act on the partly-formed bag.

Any suitable device for severing bag-lengths from the tube may be employed.

The instrumentality which I have indicated in the drawings consists of a pair of rotating cutter-blades, one of which, *j*, is shown in Fig. 1, placed at a point intermediate between the rolls A B and C D. These blades sever the bag-length, save that a small strip is left at the center the width of the bar I, thus producing, when the machine is in operation, a series of connected blanks. This central part can be severed by cutters in the rolls C D or E F, or by any other suitable means, as will be understood without further explanation. The cutter is so timed as to sever the bag-length at a time which will bring the main tube in proper position with respect to the nipper as the latter comes around into the position where it must take hold of the under ply.

The operation of the above-described mechanism is as follows: The paper tube is fed forward in such position that its mouth or front end will come between the two rolls C D just as the nipper-recess *b* is uppermost. In this position the lower ply, *x*, of the tube will, at its front, rest on the bed *a'*, a little overhanging the recess *b*. Now, supposing the parts to be in continuous motion, as the tube moves forward the nipper *a* is caused to rise and enter the mouth of the tube, and then to take hold of and clamp the under ply down upon the bed *a'*, as indicated in Fig. 3. The body of the tube still moves forward, upheld by the guide-bar I, while the under ply, *x*, is carried back and around with the nipper-cylinder, as indicated in Fig. 4, until the front end of the upper ply, *y*, which forms the front point of the diamond, is entered between the delivery-rolls E F. The nipper *a* now releases its hold, and the blank is carried through between the delivery-rolls, which press the diamond fold into shape, as indicated in Fig. 5.

The cutter severs at the proper times, as above indicated, the bag-length from the tube, and the nipper-cylinder again comes around into position to take hold of the under ply of the tube. Thus at each revolution of the nipper-cylinder a blank is severed and delivered with the diamond fold formed.

The delivery-rolls are made adjustable to and from the nipper-cylinder by slot and set-screw connection *m n*, as shown, or by other suitable means, in order to vary the distance between them, according as the bags are longer or shorter.

If I wish to make bags twice as long as those made by the mechanism represented, I make the nipper-cylinder twice the size (peripherally) of the feed-rolls, so that revolving at the same peripheral rate of speed it will make but one revolution for every two revolutions of the feed-rolls.

On the other hand, to make bags of shorter length, I reduce the size of the nipper-cylinder, preserving still the same rate of peripheral speed.

It will be, of course, necessary to correspondingly adjust the delivery-rolls and the cutter. The size of the cam *f* must also be changed to cause the nipper to continue its hold on the paper a longer or shorter time, as required for the particular size or length of fold to be made. For this purpose the cam may be made of two plates united by slot and set-screw connection and hung on the same axis, so that they may be moved together or drawn apart to increase or decrease the length of the peripheral cam portion, which acts on the roller-stud to cause the closing of the nipper upon the bed or stationary jaw *a'*.

In lieu of swinging cutters, such as shown, it is manifest that I can use any suitable severing appliances, such as blades on or in the cylinders C D, or either of them.

I remark, also, that the roll C, although a convenience, is not indispensable, for the nipper-cylinder can be used with any suitably-organized feed mechanism which will carry the blank or tube along.

Having described my invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the nipper-cylinder, the nipper carried by the same, and the guide rod or bar, the combination being and acting substantially as hereinbefore set forth.

2. The combination, substantially as hereinbefore set forth, of the guide bar or rod, the nipper-cylinder and nipper carried by said cylinder, and operating substantially as described, and mechanism for continuously feeding along the paper tube or blank.

3. The combination, substantially as here-

inbefore set forth, of the feed mechanism, the nipper-cylinder and its nipper, the guide rod or bar, and the delivery-rolls.

4. The nipper-cylinder and vibratory nipper carried by the same, in combination with the guide rod or bar recessed at that point which adjoins said cylinder, substantially as and for the purposes set forth.

5. The combination, substantially as hereinbefore set forth, of the nipper-cylinder, its fellow roll, the nipper or jaw carried by said cylinder, and operated to move, substantially as described, the feed-rolls and the delivery-rolls.

In testimony whereof I have hereunto set my hand this 27th day of September, A. D. 1879.

WILLIAM C. CROSS.

Witnesses:
JAMES T. POWELL,
M. GEORGII.