(No Model.)

H. C. BURDICK.

MANUFACTURE OF PAPER BAGS.

No. 407,814. Patented July 30, 1889.

Fig. 1.

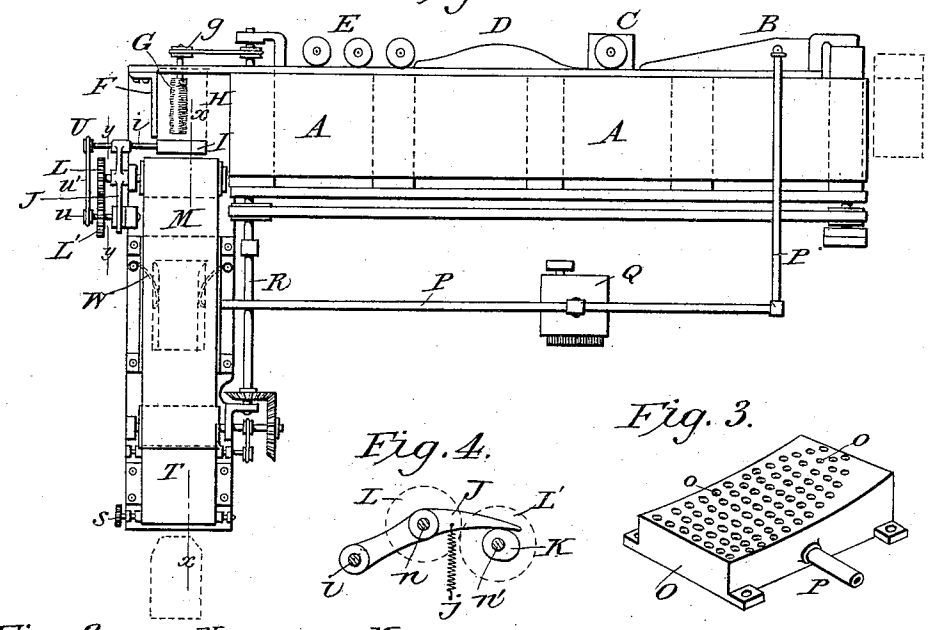


Fig. 4.

Fig. 3.

Fig. 2.

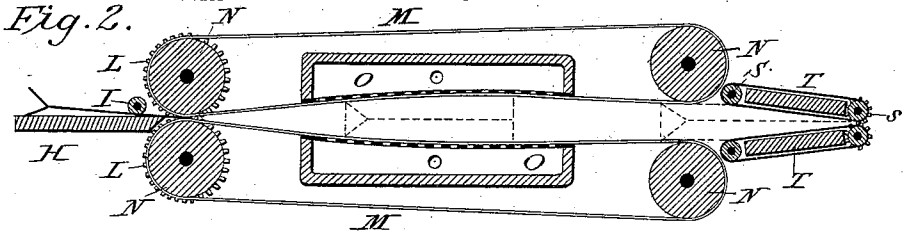


Fig. 5. Fig. 6. Fig. 7. Fig. 8.

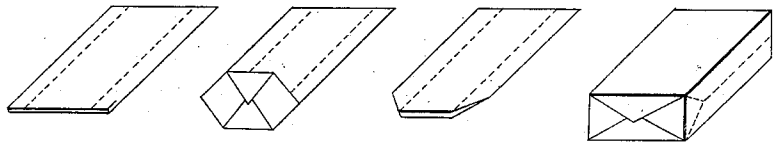
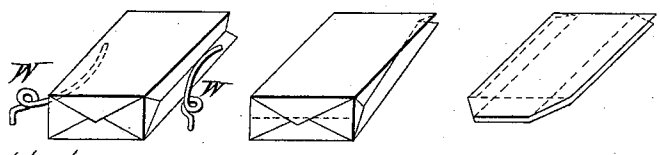


Fig. 9. Fig. 10. Fig. 11.



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UNITED STATES PATENT OFFICE.

HARRY C. BURDICK, OF NEW YORK, N. Y.

MANUFACTURE OF PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 407,814, dated July 30, 1889.

Application filed October 19, 1888. Serial No. 288,609. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. BURDICK, of the city, county, and State of New York, have invented an Improvement in the Manufacture of Paper Bags, of which the following is a specification.

My invention relates to the manufacture of paper bags; and it consists of certain improvements, which are fully set forth in the following specification, and illustrated in the drawings which accompany it.

More particularly my invention relates to the method of folding satchel-bottom bags after they have been constructed in the so-called "satchel-bottom" form into the more compact and neat and desirable shape shown in the drawings, in which the sides have bellows folds, and which is found much more advantageous in the use of the bags for merchandise.

In carrying out my method I cause the satchel-bottom bag to be formed by any suitable mechanism, and immediately after such formation of the bottom on the tube I form the sides into bellows folds, constituting a bellows-folded bag with a satchel bottom. These two steps are continuous, and the tube enters the machine and is successively subjected to mechanism to first form the satchel-bottom and then immediately form the bellows folds. This I find is the most satisfactory way of accomplishing the result. Aside from the general method, combining the steps of forming the satchel bottom and then the bellows folds, my invention also comprehends the method of forming the bellows folds.

I have shown means for carrying out my improved methods of making satchel-bottomed paper bags with bellows folds.

In the drawings, Figure 1 is a plan view of a paper-bag machine with my improvements combined therewith. Fig. 2 is a sectional view through the line $x\ x$ of Fig. 1. Fig. 3 is a perspective view of one of the suction-boxes removed from the apparatus. Fig. 4 is a sectional view through the line $y\ y$ of Fig. 1. Figs. 5, 6, 7, 8, 9, 10, and 11 are perspective views of the bag, illustrating the successive steps in the formation and folding of it.

A may be any suitable machine for making paper bags having satchel bottoms; but I prefer to use the Purvis machine provided with the suction diamond-fold former B, the pasting-wheel C, the bottom-folder D, and pressure-wheels E. The bag made from the paper tube, Fig. 5, after going through the machine A, is in the form shown in Fig. 6, which is then to be folded into the shape illustrated in Fig. 11.

G is a brush wheel or roller journaled in the frame of the machine, provided with a pulley g, and a belt-connection with a rotating shaft R, whereby it is rotated and draws the bag from the aprons of the machine A into position to be fed to the folding mechanism.

F is a guide-stop on the frame of the machine to bring the bag in proper position and alignment.

H is the guide-table, upon which the bag rests upon emerging from between the aprons of the machine A.

I is a feeding-roller carried upon a shaft i, which is secured to a lever J. This lever is fulcrumed on the shaft n of one of the guide-rollers N, and through the action of spring j presses upon a cam K, carried upon a shaft n', so that the rotation of this cam K upon its shaft will cause the lever, and, in consequence, the feeding-roller I, to rise and fall intermittently to feed the bags to the bands M. The shafts n and n' are provided with gear-wheels L and L', respectively, which mesh with each other. Upon the end of the shaft n' is a pulley u, having a band-connection u', with another pulley U on the end of the shaft i, to rotate the feeding-roller I continuously.

N are four guide-rollers about which two endless aprons M of open-work pass. The shaft of one of these rollers N is geared with the rotating shaft R, and from which motion is given to the various parts of the machine through the rotation of the other guide-rollers N by the aprons M and gearing L.

O are suction-boxes having preferably slightly-curved faces, provided with orifices or holes o. These suction-boxes are located within the aprons M and are opposite each other. By means of tubes P and a fan or vacuum-pump Q the desired suction is created.

It will be seen that the same fan or vacu-

um-creating device Q may also be connected with the suction-former B of the machine A.

The apertures *o* of the suction-boxes O are preferably more numerous and extend to a greater extent laterally at the front end than at the rear, as indicated in Fig. 3, as this will open the bag fully at the start and then permit the sides corresponding to the bellows folds to be pushed in and remain in.

It is desirable to first crease the tube from which the bag is to be formed, so that it will bend easily on the folds corresponding to the bellows folds. These creases are indicated in dotted lines in Figs. 5, 6, and 7.

T are two small endless aprons located close to the ends of the aprons M, running over four guide-rollers S, two of which are geared together, as at *s*, to insure uniform speed and travel, and the shaft of one of which rollers has a pulley-and-band connection with the shaft of the operative guide-rollers N, by which motion is given to the aprons. I prefer that these rollers S should be arranged so that the aprons will incline toward each other, as shown in Fig. 2, to flatten the bag.

W are fingers or arms, preferably springs, constructed of wire located on the frame of the machine on each side of the aprons M, and projecting slightly between them, for the purpose of making the bellows folds in the sides of the bag, as shown in Fig. 9. As shown, the combined machines are L-shaped; but this is not necessary, and my bellows-folding apparatus may be applied to any machine for making satchel-bottomed bags, or may be used independently with bags supplied to it in any suitable or convenient manner.

The mere details of construction here shown are not to be taken as limitations of my invention, as it is apparent that they may be varied in many ways without departing from the spirit of it.

The operation of the machine is as follows: The bags, having the satchel-bottom formed as shown in Fig. 6, are taken from between the aprons of the machine A by the roller-brush G upon the table H. When, through the operation of the cam K, the feeding-roller I is dropped upon the bag, a forward movement is immediately imparted to it by the rotation of the roller, and the bag is carried between the aprons M. The satchel bottom passing under the roller I and between the bands M and rollers N will be flattened, as shown in Fig. 7. The bag is now carried between the suction-boxes O, which draw toward them the aprons M, and with them the bag, opening it into the shape shown in Fig. 8. As this bag is carried by the aprons, its sides come in contact with the lateral spring-arms W, which folds in its sides, as shown in Fig. 9, and, passing thence between the flattening-aprons T, it is flattened successively into the shapes shown in Figs. 10 and 11, leaving the machine as a bellows-folded satchel-bottomed bag.

It will be observed that the treatment of the tube from the time it enters the bottom-forming machine to the time it emerges from the bellows-folding machine is continuous, and that the bellows folds are formed after the bottom is formed, which method is novel, as far as I am aware.

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

1. The method of rapidly making satchel-bottom paper bags with bellows side folds, which consists in moving the paper tube with a continuous movement, and during such continuous movement first folding one end of the flattened paper tube into a satchel-bottom and pasting said bottom thus formed, and then during the further continued movement opening the bag thus formed and folding in the sides of the finished satchel-bottom bag, forming a completed satchel-bottom bellows side-fold bag, the whole being performed in one continuous operation.

2. The method of forming a bellows-fold satchel-bottom bag, which consists in first forming the satchel-bottom bag and then causing the two flat faces of the bag to be sucked apart, and finally pressing in the edges of the sides while the faces are thus held apart.

3. The method of forming bellows folds on satchel-bottom bags, which consists in causing the two faces of the bag to be sucked apart, and then pressing in the sides, and subsequently flattening down the bag with the sides folded or tucked in to form bellows folds.

4. The method of forming bellows folds on a satchel-bottom bag, which consists in passing said bag in the direction of its length between two suction-boxes, and during its travel sucking its faces apart and simultaneously therewith pressing in the sides, and finally folding or flattening down the bag with the sides folded or tucked in to form bellows folds.

In testimony of which invention I hereunto set my hand.

HARRY C. BURDICK.

Witnesses:
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