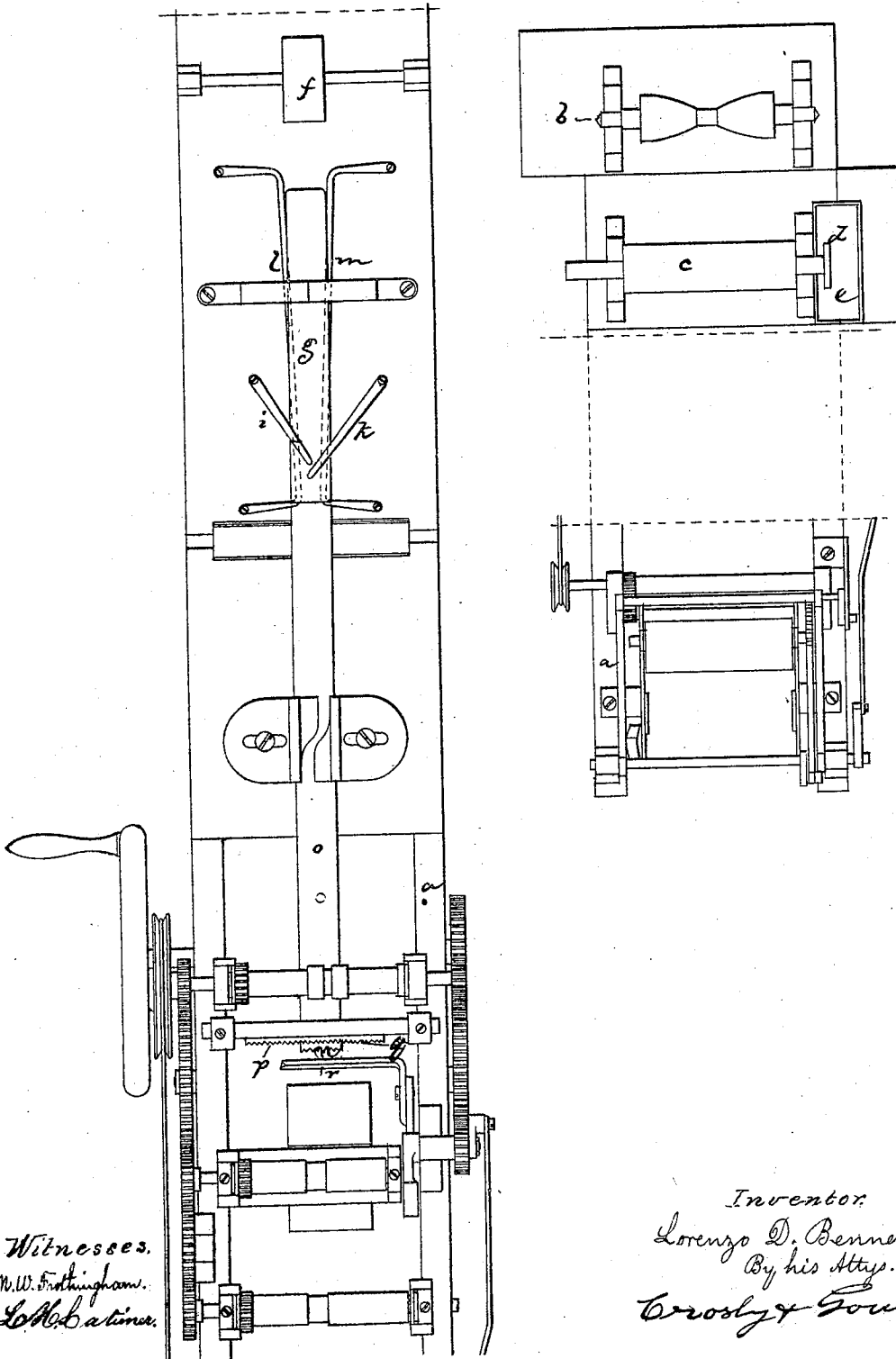


L. D. BENNER.
Paper-Bag Machines.

No. 138,844.

Patented May 13, 1873.

Fig. 1.



Witnesses.
Wm. W. Frothingham.
Edw. C. Atine.

Inventor.
Lorenzo D. Benner,
By his Atty.
Crosby & Gould

L. D. BENNER.
Paper-Bag Machines.

No. 138,844.

Patented May 13, 1873.

Fig. 2.

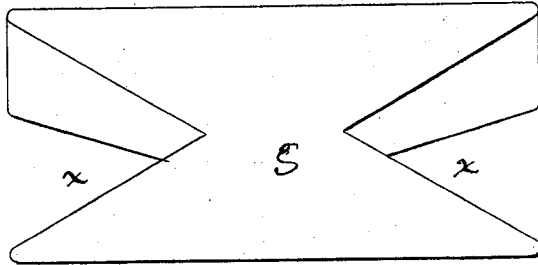


Fig. 4.

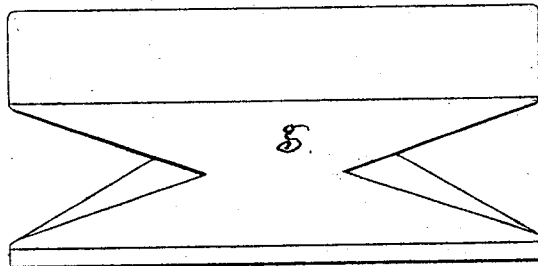


Fig. 3.

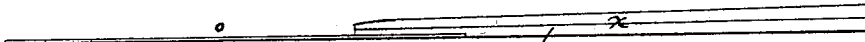
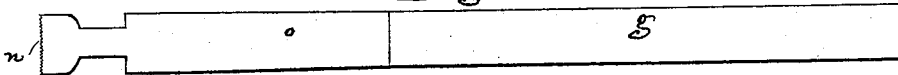


Fig. 5.



Witnesses.
Mr. W. Frothingham.
Attorney.

Inventor,
Lorenzo D. Benner,
By his Atty.
Crosby & Gould

UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNION PAPER-BAG COMPANY OF PENNSYLVANIA.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **138,844**, dated May 13, 1873; application filed February 7, 1873.

To all whom it may concern:

Be it known that I, LORENZO D. BENNER, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Paper-Bag Machines; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention relates to an improvement in the manufacture of paper bags, the improvement having reference to a method of forming continuous inward folds in the strip of paper as it passes through the machine to be formed into bags. The invention consists in the method of folding the paper to form a square bag, combining with the feed mechanism that draws paper from the paper roll, and with a former over which the opposite edges of the paper are folded, so that their extreme edges lap for union, and with the mechanism that severs the two parts of the tubular or folded paper, so that one part projects beyond the other to be lapped and cemented thereto to form the bottom of the bag, of two opposite grooves or recesses and guide-fingers for pressing the paper thereinto, these grooves being preferably so shaped that the strain upon the paper to form the inward folds is only gradually brought to bear upon it. In practicing this method I prefer to use a long, tapering, and side-grooved former-block, the paper passing under this block, and being folded at the two lower corners thereof, thereby forming one side of the bag, and being again folded at the opposite upper corners of the block, thereby forming two opposite sides of the bag, and the two edge portions that lap and, when cemented, form the fourth side. The former is of considerable length, and, as the side made or to be made by the edges and the side opposite thereto are not changed, the upper and lower faces of the block remain of the same width and surface; but as the other two opposite sides are to be folded inwardly, the block diminishes in thickness, so that the paper to constitute the two sides adjacent to the lapped-edge-side is pressed into the recesses, the paper emerging from the block as an incomplete

tube, with one side full, one side formed (or partially formed) of the two edges to be lapped and cemented, and the other two opposite sides each with a central inward fold.

My invention is particularly applicable to what is known as the Union Paper-Bag Company's machine, in which the paper is fed to the mechanism continuously from a paper roll, cement being applied to one edge as the paper leaves the roll, and its edges being next folded over the former and lapped and united by the cement, and a bag-forming length being then cut from the end of the strip, two cuts being made, one of which cuts the center portion, while the other cuts the two portions adjacent to the edges, the center portion being formed as a projecting edge, which, when folded over and lapped upon and cemented to the other, closes and forms the end of the bag. In my invention I simply change the shape of the "former" of such machines, and make in the opposite edges the grooves into which portions of the paper are drawn by suitable guides, so that inward folds are formed, which result in giving the required square shape to the bag, when the bag is completed.

The drawing represents a plan of so much of an ordinary machine of this kind as will enable my invention to be clearly understood.

Figure 1 shows a plan of the machine, the two parts connected by dotted lines showing the opposite ends.

a denotes the frame; *b*, the spindle or mandrel of the paper roll, from which the paper passes to and over another roll, *c*, the shaft of which carries a paste-applying roll, *d*, that dips into the paste-trough *e*. From the roll *c* the paper passes under a narrow guide-roll, *f*, which guide-roll has a width equal to the full side of the bag to be formed, said roll being the first instrument in the folding operation, the paper, as it is drawn over this roll and strained against its surface, bending against the opposite ends or edges of the roll. From this roll the central part of the paper passes under the former or former-block *g*, the width of which corresponds to the width of the roll *f*, the upturned portions of the paper being drawn against the sides of the former and the edges over the top of the former by the sta-

tionary fingers *i k*, which are so constructed and relatively located that as the paper is drawn under them they lay the edge portions of the paper upon the top of the former, and lap the extreme edges one upon the other, so that they are united by the cement upon the under one. From this former-block the folded paper (the former-plate being within it) passes to the severing mechanism, where it is severed into successive bag-lengths, each length having at one end a projecting center part to lap over and be united to the other parts of the end to form a bag-bottom, and each successive severed bag-length (having its side edges cemented together) having its bottom closed by folding the projected edge, and cementing it to the other portion of the end, all as in the ordinary machine.

The former-block is made with its first or initial end of the shape seen at Fig. 2, with the two opposite recesses or grooves *x*, these recesses extending along the former, as shown in Fig. 3, and the former at the opposite ends of the grooves having the shape shown in Fig. 4. Into the two opposite recesses guide-fingers *l m* conduct the portions of the paper lying against or adjacent to them, and as the recesses or grooves increase in depth and the thickness of the block decreases, the bends in the paper become inward folds, which, before the paper passes the former, are so far pressed in that each will flatten down to form an inward fold by passing between presser-rolls, the surfaces of which are in juxtaposition and press the paper into a continuous flat or folded structure, with two inward folds. When the inward folds pass beyond the grooves *x*, the inwardly-folded portions of the paper lie upon the top of the former-plate *o*, with the edge portions. Upon the end of this plate are teeth *n*. Over the plate, and just back of the ver-

tical plane of these teeth, is a plate, *p*, having teeth *q*, and as the rotating arm *r* rises it first strikes the bottom or full side of the bag, and causes such side to be cut through on the line of the teeth *n*, and then presses the folded portions (embracing the inward folds and the edge portions above such folds) against the teeth *q*, severing the bag-length, the first cut of the full side being in front of the other cut, leaving a projecting end piece on the full side, which end piece is lapped upon the edge pieces to close the bottom of the bag in the usual manner, although when lapped it covers and closes inwardly-folded portions as well as the edge portions which form the side opposite to the full side of the bag.

By this method the bags can be made as rapidly from a strip as without the use of the peculiar former, and when finished the bag of the same capacity is not only narrower by one-half, but forms a bag which, when open, is quadrangular in shape, and has all the advantages resulting from a square-bottomed bag.

In Figs. 2, 3, 4, and 5, (the latter of which represents a plan of the former,) the drawings are made in strict proportion to a former used on the "Union" machine above referred to.

I claim—

* The combination of the grooved former-block *g*, former-plate *o*, severing-teeth *n*, severing-teeth *q*, and arm *r*, when the parts are so arranged that by upward movement of the arm *r* the full side of the bag end is first cut, and then the inward folding and lapping sides thereby form an end projecting beyond the folds and lapping sides, substantially as described.

LORENZO D. BENNER.

Witnesses:

FRANCIS GOULD,
M. W. FROTHINGHAM.