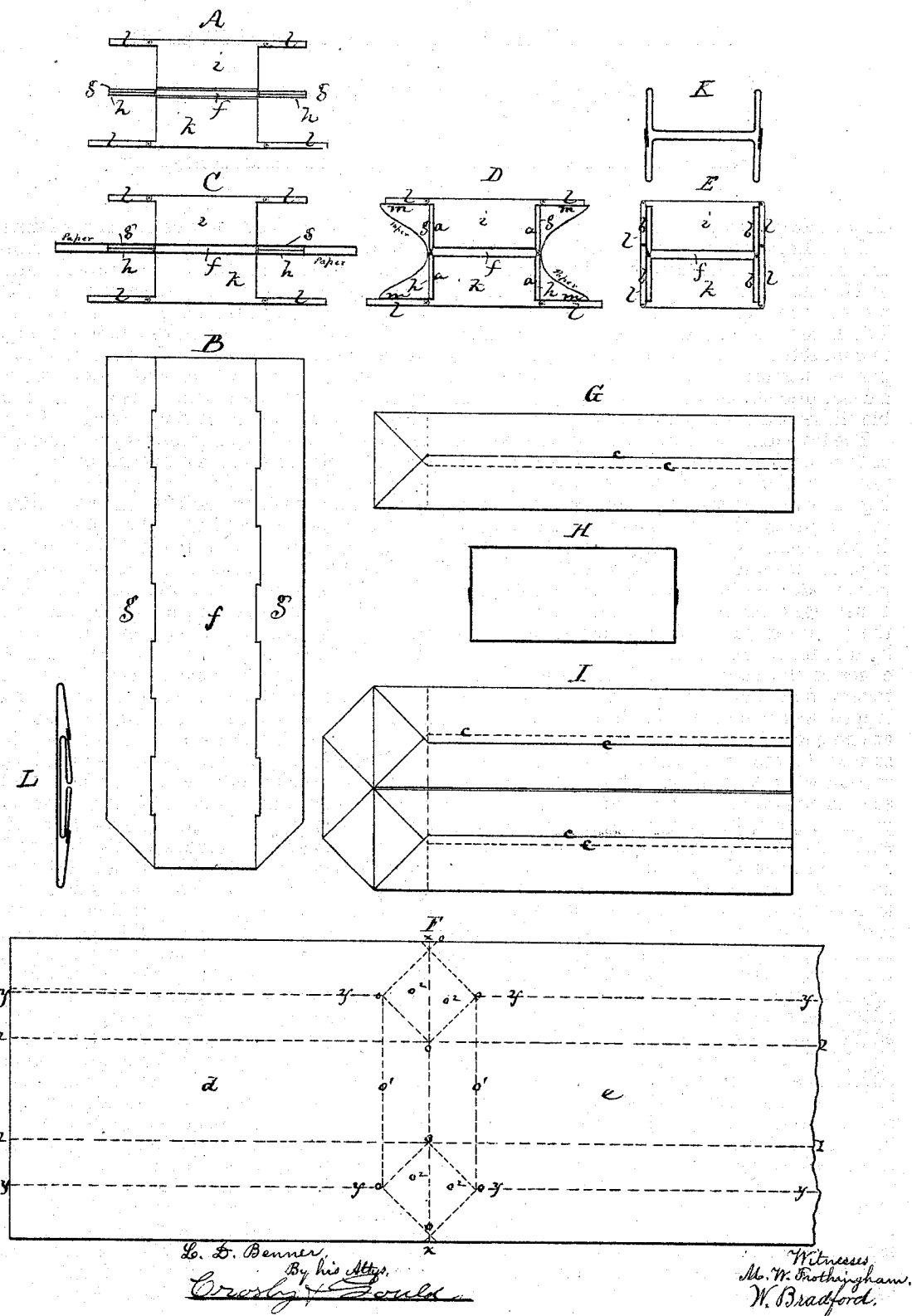


(109.)

L. D. BENNER.  
Paper Bag Machine

No. 122,510.

Patented Jan. 9, 1872.



# UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. 122,510, dated January 9, 1872.

### *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 the Manufacture of Paper Bags; 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.

The invention relates to an improved method of forming paper bags, the improvement having particular reference to the manner of folding the edges of the paper to bring the parts into proper position for the union of the edges. In practicing my method I take a long strip of paper of double the length of the bag to be formed and fold it at the center of its length. I then use a series of long formers having at their sides or edges hinged leaves or blades, by movement and action of which upon the edges of the paper said edges are folded and reverse-folded and brought into position to be lapped, and to form a tube closed or unseamed at one end, (when the paper is doubled,) and so folded as to form a bag rectangular in cross-section when distended. The invention consists in first doubling or folding the strip of paper at the center of its length, next turning each of the four edges outwardly, next folding or doubling each edge part so bent, (the two adjacent edges toward each other,) the first folding being effected upon a suitable center-former introduced between the halves of the double strip, and the next folding being effected by outward movement of the hinged leaves or blades of the center folder, and the subsequent folding or doubling of the folded edges being effected by the hinged blades or leaves of one or more auxiliary formers, the edge turned by the center former being doubled over the turned-up leaf or blade of the center former by turning down upon it the blade of the auxiliary former. The two last-turned edges being of such width that they slightly lap, or being made to lap, the union of the two edges on each side of the formers form the paper into a bag which, when distended, is rectangular in section.

The drawing represents the formers, and the bag in the various stages of its formation. At

A is shown an end view of the three formers placed together. B is the plan of the center former. C is an end view of the three formers, showing the edges of the paper turned by the various blades of the formers. D and E show end views of the paper in the different stages of the folding operation. G is a side view of the finished bag. H is an end view of the finished and distended bag. I is a plan of the finished bag compressed for packing. K is an end view of the bag as it leaves the "former;" and L represents the mouth end of the bag, shown in Fig. I.

In making the bag I take a long rectangular strip of paper, F, of double the length of the bag to be formed; this strip I fold at the center line *xx*; I then fold over each edge on the line *zz* and toward the center line of the outer side of the half of the paper, of which it forms an edge, as seen at *a*, the paper being folded from the fold *xx* on the lines *oo* to enable the edges to be turned over; I then fold on the line *yy* each of the edges so folded, as seen at *b*, and this brings the two edges *cc* together, or so that they lap or are lapped, and the union of these edges by cement completes the bag.

This is the manner in which the bag would be formed by hand. To make it on the formers I introduce between the halves *d e a* a center former, *f*, of the length of the bag to be made, having on each edge a pair of hinged blades or leaves, *g h*. On each side of this center former is an auxiliary tubular former, *i* or *k*, having on each edge a hinged blade or leaf, *l*. The respective blades being in the position seen at C when the paper is introduced, the paper over or under each blade *g h* is turned by said blade against the vertical face of the adjacent upper or lower tubular former *i* or *k*, the paper at the end or fold *xx* being folded angularly, as seen at F. Each edge part thus folded projects up beyond the blade *g* or *h*, as seen at *m*, and all the edges being thus turned, this projecting part is then folded over the leaf *g* or *h* by the adjacent leaf *l*, thus bringing the two edges at each side together, or in position to be lapped and united by cement. It will be seen that by folding the paper angularly at the line *xx* I am enabled to fold over the edges smoothly, or without rupture or distortion of the paper, and the goring pieces *o<sup>2</sup> o<sup>2</sup>* and the

parts between the ends of the folds *o o'* and the fold *xx* form a smooth bottom when the bag is distended. The lower blades *h* of the center former may be rigid or unhinged and extend out from the center plate in the plane of said plate, as when the two hinged blades *g l* have turned and reverse-folded one edge; the other edge, being turned over the stationary blade *h*, is in position to meet the edge turned by the two hinged blades. When the edges are thus folded, and the formers are withdrawn and the edges are united by cement, the folds are or may be all pressed down flatly upon one side of the bag, as seen at I, and in this condition the bags may be very compactly packed in layers or packages for use or transportation. When distended the folds may be pressed slightly outward beyond the plane of the side of the rectangle, when the paper will retain its distended form and the bag will remain open to be filled.

By a suitable system of paper rolls and feed and guide-rolls the paper may be automatic-

ally carried between two guide-rolls by the center former, and into position between the former and the cut-off, and the folding-blades operated to produce the folds, a cementing apparatus being also applied if desirable, so as to automatically fold and cement the edges and complete the bag.

I claim—

1. The improvement in making paper bags, consisting in first doubling over or folding the strip of paper across the center of its length and then folding and reverse-folding the side edges, as described, and uniting the lapping-edges, so as to form a bag of the shape shown and described.

2. The formers *f*, *i*, and *k*, having, respectively, the hinged folding leaves *g* and *h* and *l*, as described, the whole serving to fold the paper, as set forth.

LORENZO D. BENNER.

Witnesses:

FRANCIS GOULD,  
M. W. FROTHINGHAM.

(109)