No. 762,976. PATENTED JUNE 21, 1904.

D. APPEL.

ART OF PAPER BAG MAKING.

APPLICATION FILED MAR. 6, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

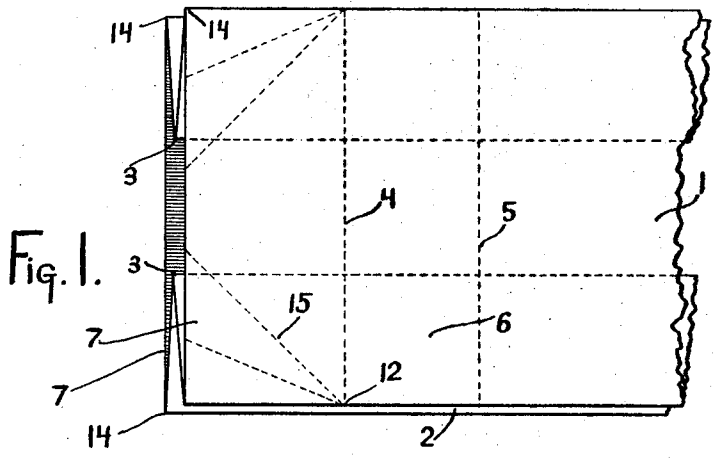


Fig. 1.

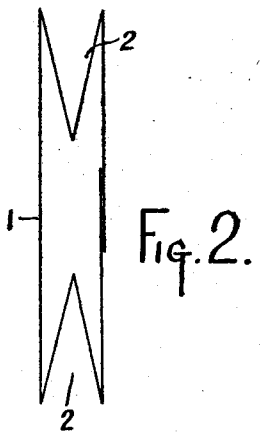


Fig. 2.

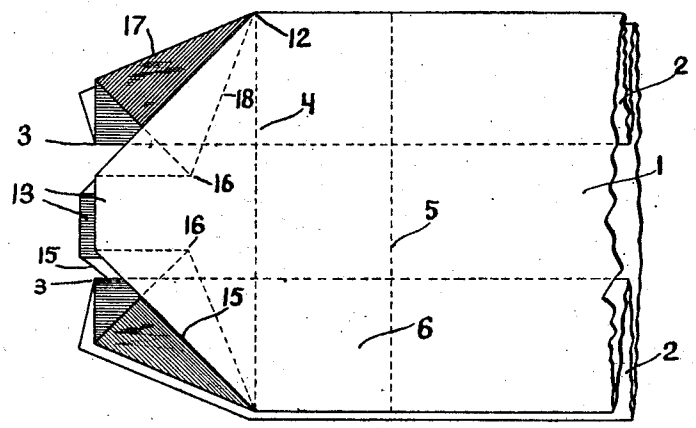


Fig. 3.

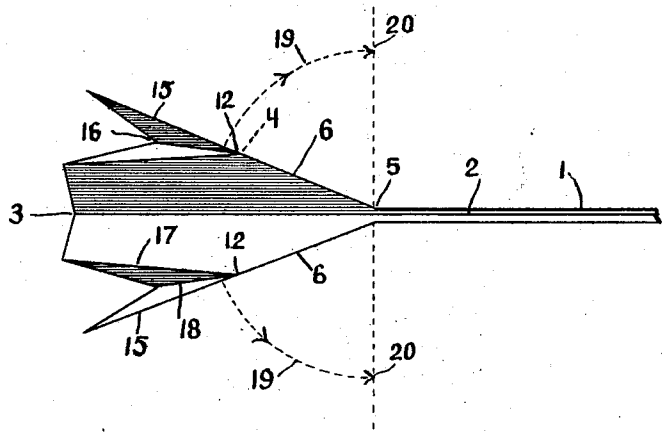


Fig. 4.

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No. 762,976. PATENTED JUNE 21, 1904.

D. APPEL.

ART OF PAPER BAG MAKING.

APPLICATION FILED MAR. 5, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

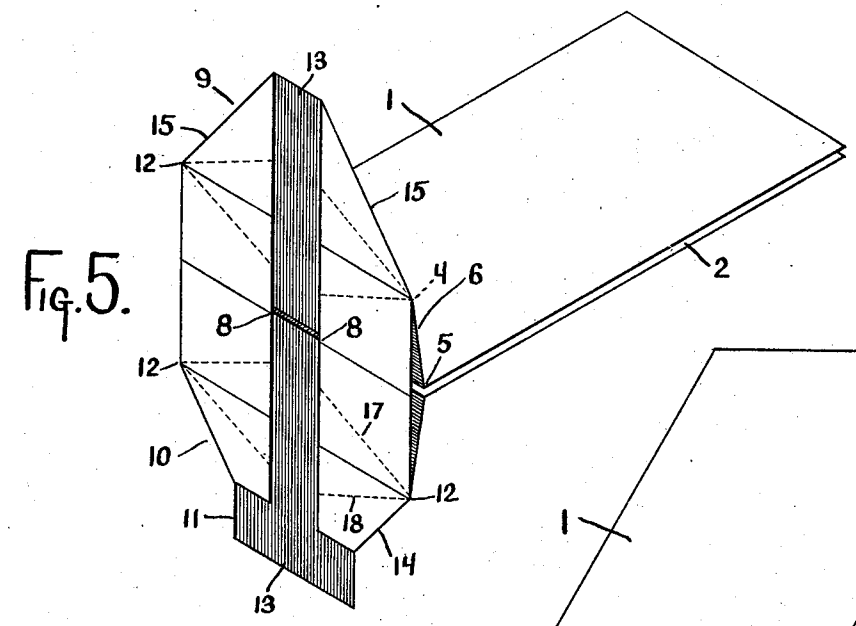


Fig. 5.

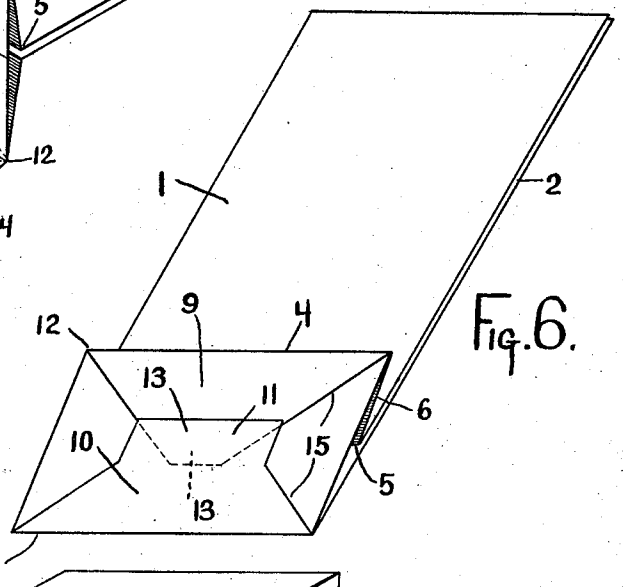


Fig. 6.

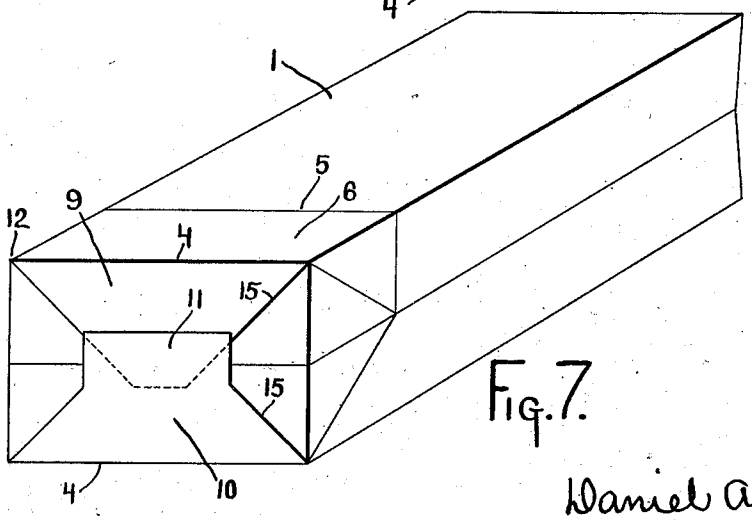


Fig. 7.

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No. 762,976. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

DANIEL APPEL, OF CLEVELAND, OHIO, ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

ART OF PAPER-BAG MAKING.

SPECIFICATION forming part of Letters Patent No. 762,976, dated June 21, 1904.

Application filed March 5, 1904. Serial No. 196,647. (No specimens.)

To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing in Cleveland, Cuyahoga county, Ohio, (post-office address, No. 62 Holyoke Place, Cleveland, Ohio,) have invented certain new and useful Improvements in the Art of Paper-Bag Making, of which the following is a specification.

This invention, pertaining to improvements in the art of paper-bag making, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a slightly perspective view of the usual plicated tube employed in forming paper bags; Fig. 2, an end view of the same; Fig. 3, a slightly perspective view showing the primary formation of the flaps by turning in the end corners of the tube; Fig. 4, a side view of the bag in the condition illustrated in Fig. 3, except that the bottom-work is more widely opened; Fig. 5, a perspective view of the bag at that stage of progress represented by the completion of the diamond fold as arrived at by ordinary methods or by my improvement; Fig. 6, a perspective view of the finished bag in flat folded form, and Fig. 7 a perspective view of the finished bag as opened out for use.

Figs. 6 and 7 represent the ordinary well-known self-opening paper bag; and the object of my invention is the economical production of this bag. Fig. 5 will be recognized as representing the ordinary condition reached by bags of this class before the flaps are folded upon the bottom and pasted. It will be noticed in Figs. 5, 6, and 7 that the lower flap 10 is provided with a tail 13, as produced by longitudinally slitting the end of the tube of which the bag is being formed. This is a very usual construction in paper bags, and my present invention may be considered regardless of the presence or absence of this tail, for it is adapted for the formation of bags with or without such tails upon the flaps—that is to say, in realizing my present invention one flap may have a tail and the other flap have none, as seen in Figs. 5, 6, and 7, or both flaps may have tails or both flaps may be without the tails. The ordinary stage of progress in producing the bag which is illustrated by Fig. 5 is a stage to be arrived at by means of my improved method with a view to increasing the speed of production and also to secure a superior and uniformly-made product.

Before proceeding with the description I think it well to adopt and define certain terms as applying to certain features in bag formation. Referring to Fig. 1, representing the bellows-folded blank, I will use the term "plications" as applying to the inwardly-projecting layers forming the bellows folds 2, and I will use the term "plication-tips" as applying to the end extremities 3 of the inner junctures of the plications. I will use the term "flap" as applying as a whole to those angular portions 9 and 10 of the diamond-folded bottom which are to be turned down and pasted against the bottom proper of the bag. I will use the term "neck" as applying to that portion 6 of the tube which, while not constituting any portion of the bag-bottom, takes part in the process of forming the bottom, and I will use the term "break" as meaning a hinging folding motion of the paper as distinguished from rupturing.

In the drawings, referring for the present only to Figs. 1, 2, 5, 6, and 7, 1 indicates the body of the tube; 2, the plications; 3, the plication-tips; 4, the folding-line where the bottom of the bag joins the body; 5, the folding-line where the neck joins the body; 6, the neck; 7, all that portion of the sides of the blank entering into the construction of the bottom; 8 in Fig. 5, the position taken by the plication-tips upon the completion of the diamond fold; 9, one of the flaps, considered as a whole; 10, the other flap; 11, the tail projection of the flap, if employed; 12, the bottom corner-points; 13, the central portions of the flaps, and 14 the outer plication-corners.

Fig. 5 will be recognized as the ordinary diamond fold, requiring simply that the flaps

be pasted to the bottom in order to complete the bag, while Fig. 1 represents the usual blank, and Fig. 7 the finished product when opened. In Fig. 5 I have shown the diamond-folded bottom as being in a plane at right angles to the body, this being done in order to secure clearness of view, it being immaterial to a realization of my invention whether these bottom parts hold this right-angular position or a position parallel with the plane of the body, both positions being well-known ones in the making of paper bags of this kind. In the ordinary production of the diamond fold illustrated in Fig. 5, whatever the details of the method may be, there is at once an action on all of the paper extending outwardly beyond line 5—that is to say, all of this paper is put into action at once and involved in the operation and all of the breaking and folding down is upon lines representing ultimate folds of the finished product. The completed diamond fold represents certain angular and parallel lines, and the work of bottom-formation, as usually done, proceeds at once at all points to deal with those lines as breaking-lines. For instance, referring to Fig. 1, the blank being supported at line 5 and the tube end being widely opened out by any means, the plication-tips 3 move outwardly and then move inwardly, causing the plicated sides of the bottom to break on the lines extending between the points 12 in Fig. 5 till they finally take the positions indicated at 8 with the diamond flaps as in Fig. 5. Such is the ordinary operation. In carrying out my present invention I produce the diamond fold by a step-by-step operation. I first deal with the bottom-forming paper alone without disturbing the neck-paper or body-paper, and I produce in the bottom-forming paper a temporary set of folds, which folds are later abandoned. My object in producing these temporary folds is to develop correctly the angular folds of the flaps and to create points of attack upon the paper to bring about the complete diamond fold. Up to the end of the completion of the first step of the process the plication-tips are undisturbed.

Referring to Fig. 1, I impress a crease at the line 4 to facilitate the folding. I support the plication-tips 3 to prevent their bending or kinking. I then produce folds, as in Fig. 3, on diagonal lines extending from the corner-points 12 by pushing inwardly at points 14 of Fig. 1, tucking the paper inwardly till those points take the position indicated at 16 in Fig. 3, the result being the diagonal flap-boundary lines 15 and the temporary diagonal folding-lines 17 and 18. The object of this step is to develop the flap-faces and to develop the corner-points 12 while the plication-tips are in normal position. This completes the first step of the operation, and attention is called to the fact that the angle of the temporary folding-lines 17 and 18 may vary without the slightest detriment to the result. The blank as thus preliminarily folded may then be pressed to give good definition to the folds. An inspection of Fig. 3 will show that the faces of the two flaps and also the corner-points 12 have been completely developed, and it is to be observed that the plication-tips 3 are still in original position and that some of the paper which is to go into the formation of the bottom is projecting outwardly beyond the flap-lines 15, while some of it is diposed between the preliminarily-formed flaps. The first step of the process having been thus completed, I now take hold of the flaps at points slightly forward of the points 12 and separate or distend the flaps in the opening direction to their full extent, the grasped points being carried in the curved paths indicated at 19 and carried to the points 20 of Fig. 4, the outer paper hinging at the line 5. In this operation the plication-tips move inward, while the plies at the crease-line 4 are separating to form the parallel side lines of the diamond and complete the diamond to the form indicated in Fig. 5. The temporary diagonal folds which have been necessary to develop the flaps and provide grasping-points to distend the same to complete the diamond having performed their functions are abandoned, and the product, as represented by Fig. 5, is ready for the usual subsequent steps. For heavy paper it may be found advantageous to crease it at the temporary-fold lines.

My present invention is quite independent of any instrumentalities or machinery to be employed in carrying out the method; but it may be stated that the nature of the movements of and the strains upon the paper are such as to permit of operations being carried on with very much greater rapidity than when the bag-bottoms are formed upon the usual method, the consequence being that speeds of production become available which would not be available under ordinary systems on account of the serious losses due to tearing and other damages, while the product itself will be of superior perfection owing to the lightness and uniformity of the punishment to which the paper is subjected, the separation of the diamond-folding work into two separate steps, as indicated, causing the paper to be gently and accurately guided in its course toward ultimate condition.

I claim as my invention—

That improvement in the art of making paper bags from plicated tubes which consists in, first, developing a folding-line across the tube where the paper for the bottom joins the balance of the paper; second, supporting the plication-tips; third, producing temporary

diagonal folds radiating from the points corresponding with the corners of the bag-bottom to develop the flap-faces prior to the other portions of the ultimate diamond; and, fourth, straining apart to full extent the corners of the bag-bottom in the direction opening the plications, whereby the paper in turning upon the temporary-fold lines takes on the regular diamond fold and abandons the temporary-fold lines.

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