D. APPEL.

MANUFACTURE OF PAPER BAGS.

APPLICATION FILED DEC. 21, 1911.

1,029,784.

Patented June 18, 1912.

Fig. 1.

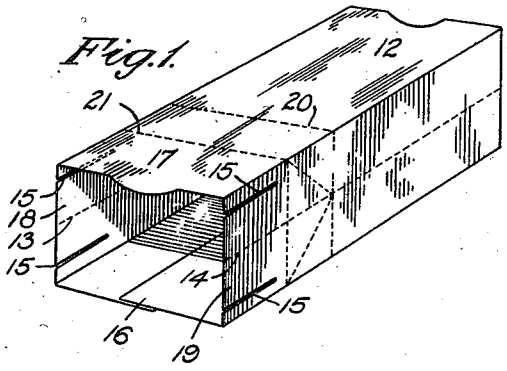


Fig. 2.

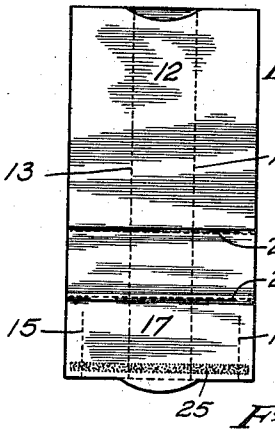


Fig. 3.

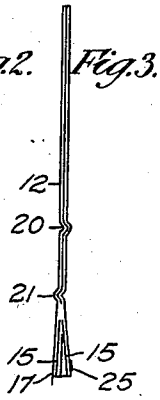


Fig. 4.

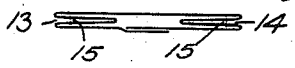


Fig. 5.

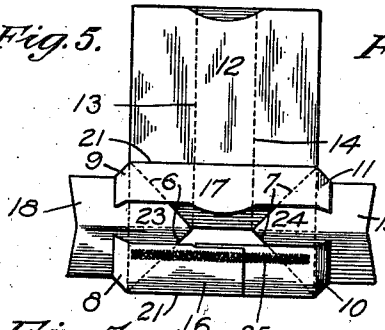


Fig. 6.

Fig. 10.

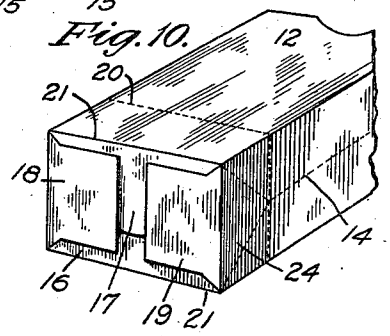


Fig. 7.

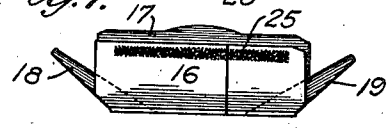


Fig. 11.

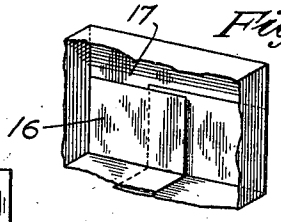


Fig. 8.

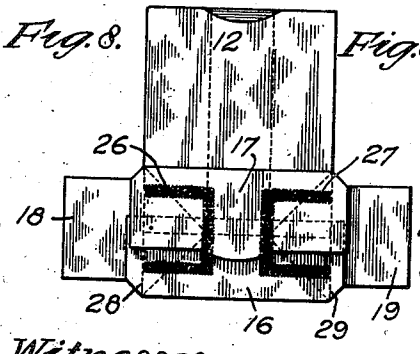


Fig. 9.

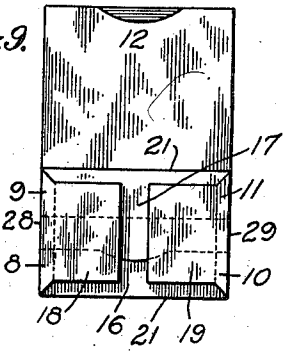
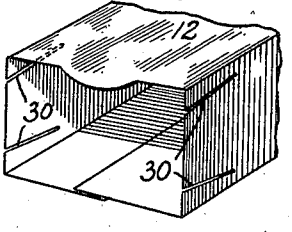


Fig. 12.



Witnesses:

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Inventor:

Daniel Appel

by his Attorney

W. H. Honiss.

UNITED STATES PATENT OFFICE.

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

MANUFACTURE OF PAPER BAGS.

1,029,784. Specification of Letters Patent. Patented June 18, 1912.

Application filed December 21, 1911. Serial No. 667,120.

To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing at East Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in the Manufacture of Paper Bags, of which the following is a specification.

This invention is an improved process of manufacturing paper bags of the type commercially known as "self-opening square", having collapsible bellows sides and square bottoms; whereby they may be commercially manufactured at a high rate of speed, smoothly, and with a minimum waste. This process is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the bag blank in rectangular form, showing the location of the four slits in the bellows sides. Fig. 2 is a plan view, Fig. 3 a side view, and Fig. 4 an end view of the blank of Fig. 1, with its bellows sides collapsed to flatten the blank. Fig. 5 is a plan view, Fig. 6 a side view, and Fig. 7 an end view of the blank with the bottom end partially folded, the two side flaps being spread outwardly, and the two end flaps drawn toward each other. Fig. 8 is a plan view illustrating a further step in the folding operation, the end flaps being folded to final position, while the side flaps are spread flatly outward. Fig. 9 is a plan view, showing the bag bottom completed, with the side flaps folded down upon the end flaps. Fig. 10 is a perspective view of the bottom end of the completed bag in opened form. Fig. 11 is a perspective view of the inside of the bag bottom, the body portion being broken away to show the interior arrangement of the bottom folds. Fig. 12 shows a modified arrangement of the slits in the bellows sides of the tube.

In carrying out this process the tubular blanks 12 are made in any well known way, preferably by tubing machines in which a web of paper is drawn from a roll and formed into a continuous tube from which the blanks 12 are successively severed. The slits 15 are more conveniently made when the blank or tube is in more or less opened or expanded condition, while passing through the tube forming apparatus, before being collapsed and flattened to the form shown in Figs. 2, 3 and 4. Creases 20 and 21 are preferably made in the flattened blank to locate and facilitate the making of the subsequent bottom folds, the crease 20 being the line of the well-known primary transverse fold, while the crease 21 is at the location of the bottom corners of the completed bag. The bottom end of the blank is then opened to the form shown in Figs. 5, 6 and 7 by separating the upper and lower plies 16 and 17, and spreading flatly outward the bellows side plies, unfolding them from their V form to a flattened form and defining the inclined sides 6 and 7 of the inner triangular folds 23 and 24, the continuations of which form the flat tabs 18 and 19 of the side flaps. A line or band of paste 25 is applied to one of the end flaps 16 or 17 between the portions thereof which are to be interlapped, so as to ultimately paste these interlapped portions together. This line of paste may be applied at any convenient time, either before or during the bottom forming operations. This paste line is herein shown to be applied upon the outside of the end flaps, since that flap is in this case intended to be folded beneath its companion end flap 17. As the bellows side plies are spread outwardly to the position shown in Figs. 5, 6 and 7, they unfold smoothly, and easily, in a natural way from their folded V form into a flattened form. The remaining unslitted portion of the side flaps, at the inner ends of the slits 15, serve as a connection between the end and side flaps, by means of which each assists the other in their respective normal folding movements. Hence the folding down of the end flaps tends to push the side flaps outwardly, and conversely, the outward folding movement if applied to the side flaps tends to draw the end flaps 16 and 17 toward each other, as illustrated in Figs. 5 and 6. Therefore, the folding instrumentalities used for performing this step of the process may be applied either to the end flaps, to fold them together, or to the side flaps, to spread them apart, or to both together. In any case, the respective flaps are flattened down to the condition shown in Fig. 8, in which state lines or bands 26 and 27 of paste are applied upon the outer surfaces of the end flaps 16, or upon corresponding portions of the side flaps. These side flaps are then folded over on their hinge lines 28 and 29, down upon the

end flaps, thus defining the outer sides of the triangular folds 23 and 24 and completing the rectangular bottom of the bag, as shown in Fig. 9.

The slits 15 are disposed in generally longitudinal relation to the bag blank. They may, however, be slightly curved, or may be inclined as shown by the slits 30 in Fig. 12. These slits are located in the four plies of the bellows-sides between the longitudinal fold lines of those plies, so that the middle portions of the bellows sides between the slits will when spread outwardly, as shown in Figs. 5 and 7, form the flat single ply tabs 18 and 19; while the remaining marginal portions 8, 9, 10 and 11 of the bellows side plies which are separated from the tabs by the slits, remain integrally connected with the upper and lower plies of the blank. Therefore, when these plies are folded downwardly to form the end flaps 16 and 17 of the bag bottom, their marginal extensions 8, 9, 10 and 11, severed from the bellows side plies by the slits, will extend across and beyond the fold or hinge lines 28 and 29 of the side flaps, thus reinforcing the hinge and base portions thereof; and also forming a safety seal for these edges of the bag bottom and precluding the formation of holes in the corners of the bag, which would occur if the slits 15 were made coincident with those corners.

The width of the tabs 18 and 19, which is determined by the distance apart of the slits 15, may be varied. I prefer, however, to make these tabs wider than the interlapped portion of the end flaps 16 and 17, in order that the tabs when pasted down upon the bottom of the bag shall extend wider than the interlapped portion, thereby further reinforcing the bottom of the bag. Moreover, this relatively wide slitting of the bellows sides also greatly facilitates the operations of folding the bag bottom, since it frees from undue restraint of each other the side and end plies which have to be folded in diverse directions. It enables the ends of the bellows-side plies to open freely to a flat form, as they are folded outwardly in the longitudinal development of the inner triangular folds 23 and 24, without undue restraint from the end plies 16 and 17, while the remaining unsevered connection with those end plies tends to draw them toward each other in the direction of their intended folding movement as the bellows sides are folded outwardly, as illustrated in Figs. 5 and 6. This location of the slits and the order or sequence of the folding operations results in smoother and better defined folds, and permits greater rapidity in the folding operations, which is of great importance in the commercial manufacture of paper bags, especially in using thin or brittle paper. By spreading the bellows side plies flatly outward during the initial development of the triangular folds before cross folding them along the hinge lines of the side flaps, the V-shaped bellows folds are unfolded naturally all the way to their bottom ends. In the ordinary commercial manufacture of this type of bag, the flap forming portions of these side folds are cross-folded inwardly upon their hinge lines contemporaneously with the unfolding of the side plies and the development of the triangular folds, so that all three sides of the triangular folds are made at the same time and by the same step in the folding operation. The V-shaped formation of the partly unfolded bellows plies resists this contemporaneous cross folding, and results in frequent buckling and distortion of the resultant bottom folds; whereas by the present process, the bellows side folds are fully unfolded and flattened out before cross folding them at the hinge lines, thus dividing the formation of the triangular folds into a two-stage operation, separated by the operation of folding down the end flaps, thereby simplifying and perfecting each step in the operation without increasing the number of steps, or the time required for the entire folding operation.

I claim as my invention:—

1. The process of making a flat bottomed paper bag from a bellows-sided tube, which consists in making a longitudinal slit in the bottom forming end of each of the four bellows sided plies between the inner and outer fold lines of those plies; then opening the bottom end of the tube and flattening the bellows sides thereof outwardly to form single ply side flaps; then folding down the remaining portion of the bottom end of the tube to form the end flaps of the bottom, and marginal extensions thereof overlapping the bases of the side flaps; then folding the said side flaps with the said overlapping marginal portions down upon the end flaps to complete the bottom of the bag.

2. The process of making a flat bottomed paper bag from a bellows-sided tube, which consists in forming two longitudinal slits in the bottom forming ends of each of the bellows sides of the tube, then opening the said bottom ends of the tube and spreading the bellows sides thereof outwardly to develop the inclined sides of the triangular folds and form bottom-forming side flaps terminating in single ply tabs consisting of the paper lying between the slits of the respective bellows sides, then folding the remaining portions of the bottom end of the tube toward each other to form interlapping end flaps, having marginal extensions which project beyond the sides of the bag and partly overlap the side flaps, and then folding the said side flaps over upon the said end flaps to complete the bottom.

3. The process of making a flat bottomed

paper bag from a bellows-sided tube, which consists in forming a longitudinal slit in the bottom end of each of the four plies of the bellows sides, then opening the bottom end of the blank, and spreading the said bellows side plies outwardly and flattening them to form the inner inclined sides of the characteristic triangular folds and the side flaps for the bottom, the said side flaps each terminating in a flat, single-ply tab the sides of which are defined by the said slits, then folding and pasting the end flaps together to form connected inner plies for the bottom, then folding and pasting the side flaps with their single-ply tabs flatly down upon the end flaps to form the outer sides of the triangular folds and complete the flat bottom of the bag.

4. The process of making a flat bottomed bellows-sided paper bag from a bellows-sided tube, which consists in making a longitudinal slit in the bottom forming end of each of the four bellows-sided plies between the inner and outer fold lines of those plies; then opening the bottom end of the tube and flattening the bellows sides thereof outwardly to define the inner inclined sides of the triangular folds and develop flat side flaps for the bottom, terminating in single-ply tabs formed of the portions of the bellows plies situated between the said slits; then folding down and pasting together the end flaps to form the inside plies of the bottom; then folding and pasting the side flaps upon the said end flaps, to define the outer sides of the triangular folds and form the outside plies of the bottom.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

DANIEL APPEL.

Witnesses:

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CAROLINE M. BRECKLE.