

No. 720,366.

PATENTED FEB. 10, 1903.

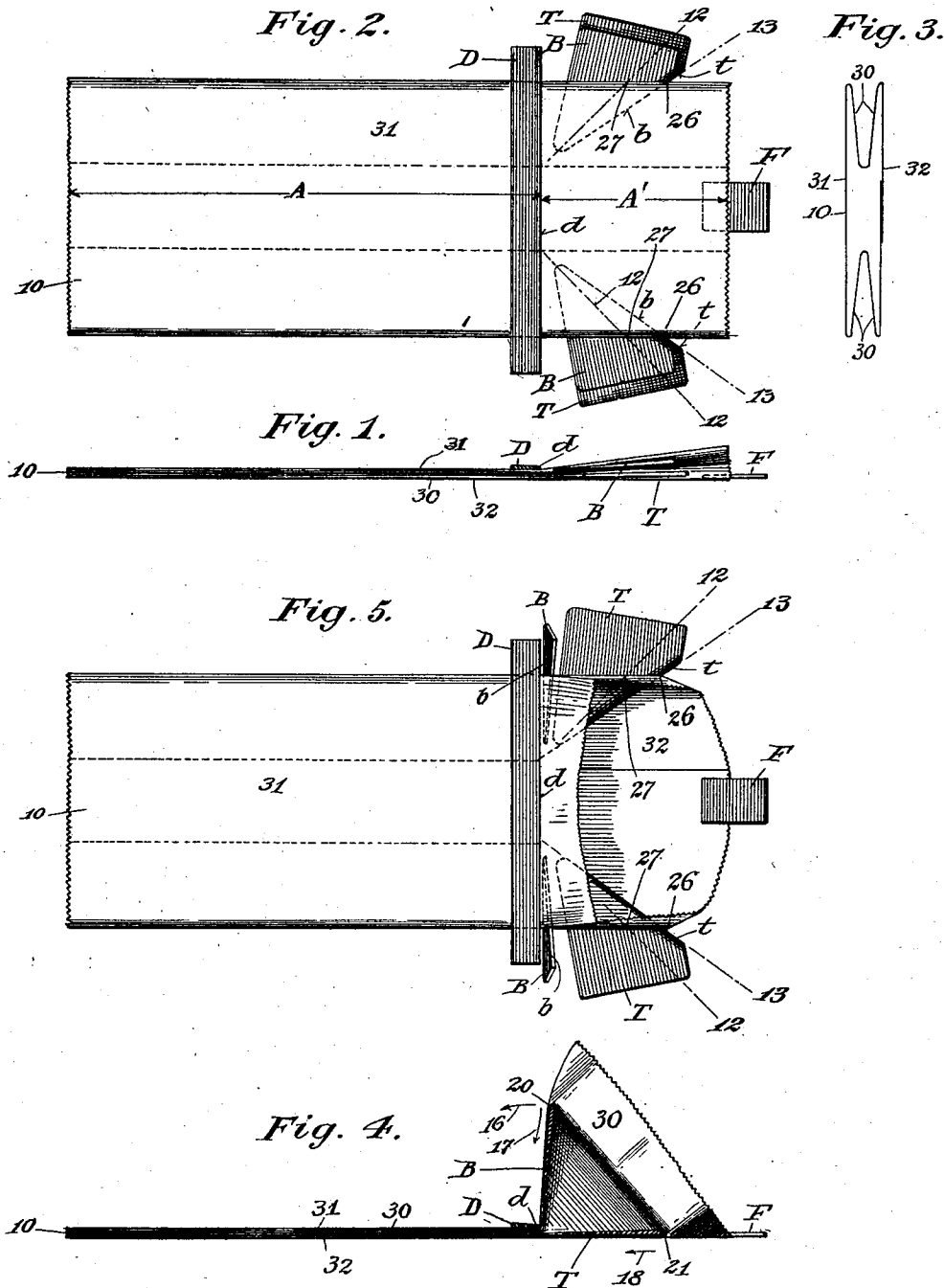
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ART OF MANUFACTURING SQUARE BOTTOM PAPER BAGS.

APPLICATION FILED JAN. 2, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 6.

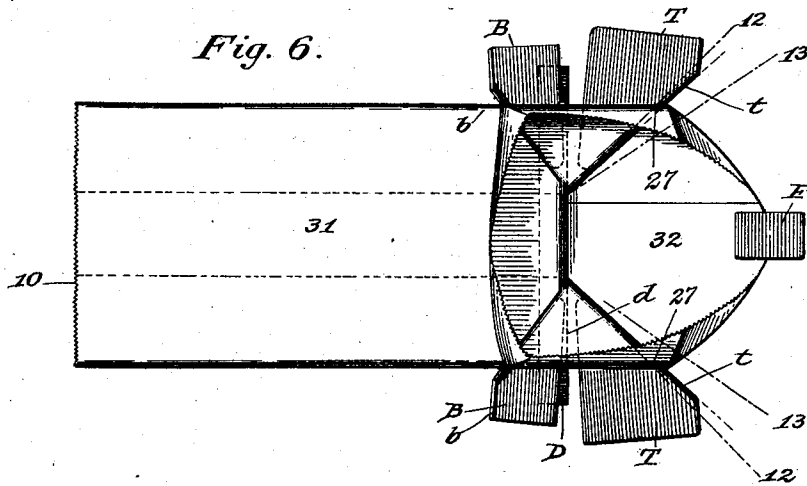


Fig. 7.

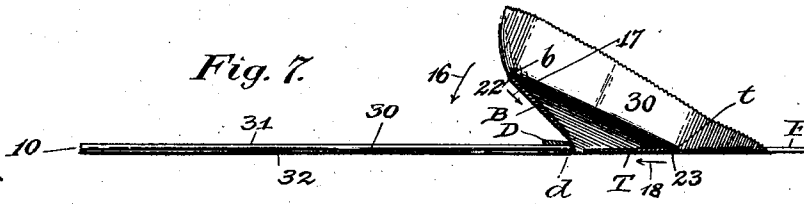


Fig. 8.

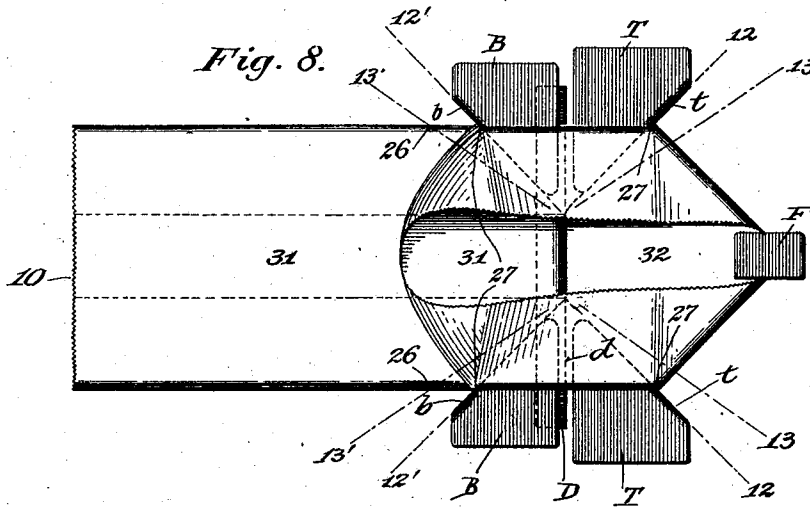
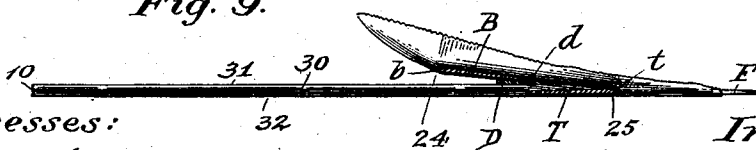


Fig. 9.



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ART OF MANUFACTURING SQUARE-BOTTOM PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 720,366, dated February 10, 1903.

Application filed January 2, 1901. Serial No. 41,896. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in the Art of Manufacturing Square-Bottom Paper Bags, of which the following is a full, clear, and exact specification.

This invention relates to the art of manufacturing square-bottom paper bags; and it has for its object an improved process of forming the so-called "diamond fold" in a bellows-sided or tucked tube or blank, such process being adapted for use in connection with well-known methods of forming the tubular blank and of subsequently pasting and folding the diamond of the blank to complete the bag.

My improved process has more particularly for its object an easy and rapid manner of forming the "inside triangular folds" without subjecting the material to any excessive strain, so that all liability of breaking the surface thereof or of tearing the same may be avoided.

To this end my invention comprises as one of its features the process of opening out the bottom-forming end of the tube or blank by stretching the sides thereof between certain points on the upper and lower plies, the several instrumentalities for holding said plies being caused to engage the same at points which are more remote from the bottom-defining line than is compatible with the proper form of said inside triangular folds, while during the operation of completing the diamond form said points of engagement are gradually shifted toward the defining-line. When the so-called "box form" has been substantially developed, the inside triangular folds will not have assumed their required form as yet, although the tucked sides have been fully straightened out.

One of the common methods of forming the diamond of a bag-blank comprises the engagement of the upper and lower plies thereof by suitable devices generally known as "tuck and box holders," these devices engaging said plies at a certain distance from the bottom-defining line, so that when the tucked sides

are gradually straightened out or stretched by said devices the inside triangular folds will be fully developed. The process of straightening out or stretching the tucked sides is usually carried out by swinging the devices which engage the upper ply of the blank away from the devices engaging the lower ply and substantially around the defining-line as an axis, the distance from each of said devices to the defining-line remaining uniform throughout this folding operation. In practice better results may be obtained when the sides are stretched out quickly, as compared with the angular movement of the box-holders away from the tuck-holders—in other words, when said sides are straightened out fully before the upper ply has been fully folded over.

My improved process therefore comprises as one of its steps the engagement and opening out of the upper and lower blank-plies at and between points which are at such distance from the defining-line as to require only a comparatively small angular movement of one relative to the other in order to stretch out the tucked sides fully and then to permit the ply-engaging members gradually to move toward the defining-line as the arc or angular movement of said members relative to each other is increased until said members are in position at opposite sides of the defining-line and form nearly a straight line therewith, at which time the inside triangular folds have been fully developed.

A process incorporating my invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a bag-blank, illustrating the manner in which the upper and lower plies thereof are engaged by the folding instrumentalities. Fig. 2 is a top view of Fig. 1. Fig. 3 is an end view of the blank. Figs. 4 and 5 show the blank sides fully straightened out to form the box, the upper ply having been partly folded around the defining-line from the position shown in Fig. 1 to that shown in Fig. 4, which represents a side view, while Fig. 5 is a top view of Fig. 4. Figs. 6 and 7 show a further advancement in the folding operation and illustrate

the folding instrumentalities in slightly-contracted position while the tuck sides remain straightened out; and Figs. 8 and 9 show a side view and top view, respectively, of the blank when the folders have arrived at their final position and the diamond is substantially completed.

In the drawings the blank 10 is shown having tucked or bellows sides 30 and comprising the bag-section A and the bottom-forming section A', the boundary-line between said sections being generally known as the "defining-line" and substantiated in the present instance by the edge d of the defining member D. Referring to Figs. 1 and 2, the upper ply 31 of the blank is illustrated engaged by the so-called "box-holders" (designated by B) and the proper function of which is to fold said upper ply around the defining edge d , while the lower ply 32 of the blank is engaged by the so-called "tuck-holders" T and the front diamond-holder F. In Fig. 2 the line of engagement heretofore employed between the working edges b of the box-holders B and t of the tuck-holders T is indicated by the dot-and-dash line 12, and the position of said working edges corresponded with this line throughout the folding operation in order to form the proper inside triangular folds commensurate with the depth of the tucks. Now it has been stated above that better results may be obtained by stretching out the tucked sides quickly as compared with the angular movement of the box-holders away from the tuck-holders, and in the present case I accomplish this end by so disposing the box-holders and tuck-holders that they will engage the upper and lower plies, respectively, at such points thereof the distance of which from the defining-line is greater than the depth of the tucks, as is, for instance, shown in Fig. 2, in which dot-and-dash line 13 indicates the initial engaging position of the edges b and t of the box-holders B and the tuck-holders T, respectively. If the box-holders B are now swung away from the tuck-holders T, substantially around the defining edge d as an axis, and said holders retain their positions relative to the upper and lower plies 31 32 of the blank, respectively, it will be clearly seen that the tucked sides will be stretched out until the position shown in Fig. 4 has been reached, when the sides 30 of the blank are fully distended, while, however, the arc or angular movement between the box and tuck holders so far has been comparatively small. The so-called "box" is now completed, and in the further manipulation of the bag-blank the angular movement of the box-holders will be continued in the direction of arrow 16, Fig. 4; but owing to the fact that the sides of the blank are already fully stretched out it follows that the box-holders must necessarily have a movement toward the tuck-holders as well and in the direction of the arrow 17. Inasmuch as the tuck-holders T engage the lower ply of the blank at points which corre-

spond and coincide with those of the box-holders B, the tuck-holders also will have a movement toward the box-holders in the direction of arrow 18, so that when the folding operation has been continued to the position shown in Figs. 6 and 7 the distance between the engagement-points 22 and 23, respectively, from the edge d will be less than that between the engagement-points 20 and 21, respectively, (see Fig. 4,) from the said edge d .

As the folding operation is continued from the intermediate position (shown in Figs. 6 and 7) to the final position (shown in Figs. 8 and 9) the points of engagement on the plies will move toward each other until the distance of each of said points from the defining line or edge d equals the depth of the tucks, at which time the inside triangular folds assume their proper form. (See Fig. 8.) It should of course be remembered that during this operation the sides 30 of the blank will remain in fully-distended or stretched-out condition, so that the distance between the points 20 and 21 will be equal to that between the points 22 and 23, and, furthermore, on continuing the folding operation, also equal to the distance between the points 24 and 25 (see Fig. 9) when the box-holders have been swung over to their final position and the diamond is substantially formed. By comparison of Fig. 2 or Fig. 5 with Figs. 6 and 8 in the order named the shifting movement of the points of engagement may be clearly seen, and since in the present instance the starting position of the box-holders coincides with that of the tuck-holders, as shown in Fig. 2, both holders engaging their respective tube-plies at points equidistant from the defining edge d , the shifting movement of the box-holders must correspond to that of the tuck-holders, and, as is illustrated in Fig. 8, from the line 13' to 12', so as to develop the inside triangular folds into their proper form.

While in the present case the holders have preferably an angular movement from the line 13 to the line 12, such a movement need not necessarily take place, the particular object of the invention being a shifting movement of the points of engaging the plies of the tube—as, for instance, from the points 26 to the points 27 thereof. Likewise it is obvious that the same result may be obtained if only one of the engagement-points be shifted toward the other or if the amounts of shifting movement of both points should vary, provided, however, that the distance between the holders be decreased to the proper amount during the diamond-forming operation and that said points are substantially equidistant from the defining-line at the end of said operation.

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

1. The process of forming the diamond of square-bottom paper bags from bellows-sided tubing, which comprises a complete disten-

tion of the tucked sides at such points between the end of the blank and the defining-line, the distance of which from the defining-line is greater than the depth of the tucks, and shifting such points after such distention while completing the diamond fold.

2. The process of forming the diamond of square-bottom paper bags from bellows-sided tubing, which comprises the engagement of the sides of the upper and lower tube plies at points, the distance of which from the defining-line is greater than the depth of the tucks; stretching out the tucked sides between such points, and subsequently shifting said points of engagement toward the defining-line to develop the triangular folds into their proper form.

3. The process of forming the diamond of square-bottom paper bags from bellows-sided tubing, which comprises the engagement of the sides of the upper and lower tube plies at such points the distance of which from the defining-line is greater than the depth of the tucks; stretching out the tucked sides between such points to form the box, and subsequently shifting such points of engagement toward the defining-line, while, at the same time, the points of engagement are brought to positions at opposite sides of the defining-line, to develop the inside triangular folds into their proper form.

4. The process of forming the diamond of square-bottom paper bags from bellows-sided tubing which comprises the engagement of the sides of the upper and lower tube plies, at points, the distance of which from the defining-line is greater than the depth of the tucks, and the complete distention of the tucked sides preparatory to developing the inside triangular folds into their proper form, and then shifting said points of engagement toward each other during the completion of the diamond.

5. The process of forming a diamond of square-bottom paper bags from bellows-sided tubing which comprises the engagement of the upper and lower tube plies at such points, the distance of which from the defining-line is greater than the depth of the tucks, completely distending the tucked sides between such points preparatory to developing the inside triangular folds into their proper form, and then decreasing the distance between said points of engagement, while at the same time said points are brought to positions at opposite sides of the defining-line to develop the inside triangular folds into their proper form.

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