

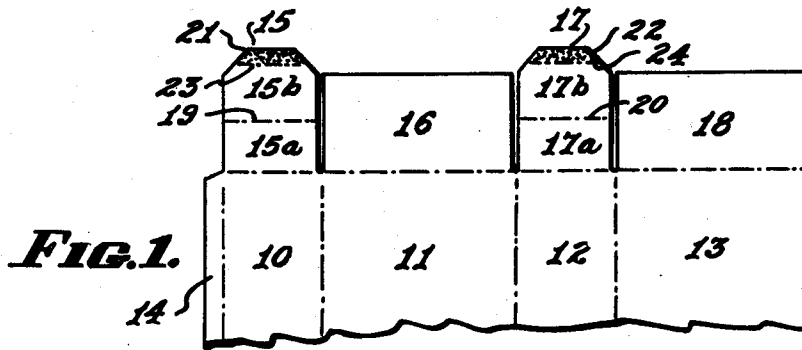
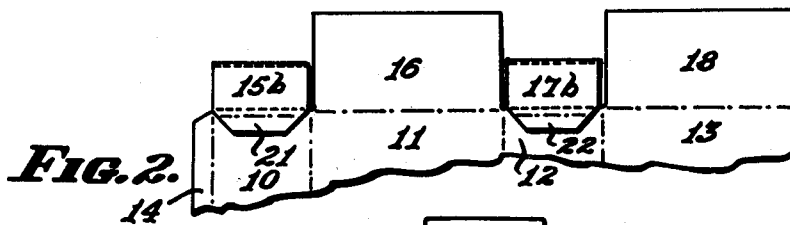
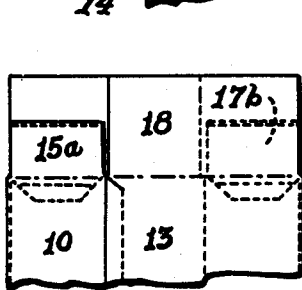
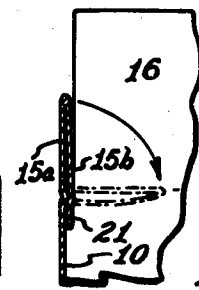
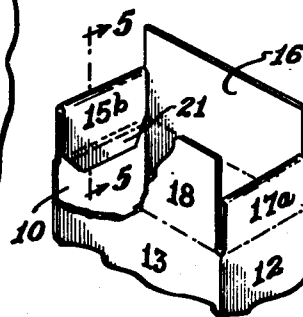
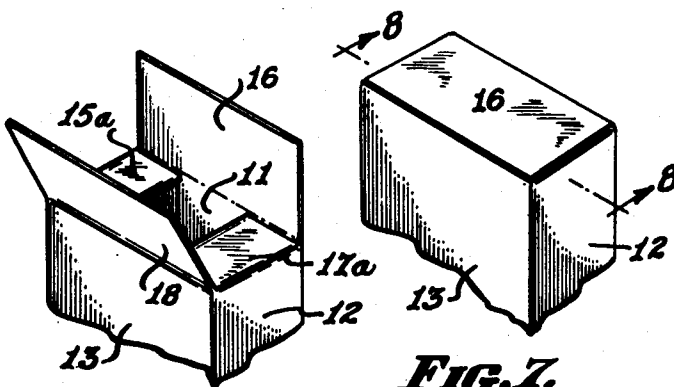
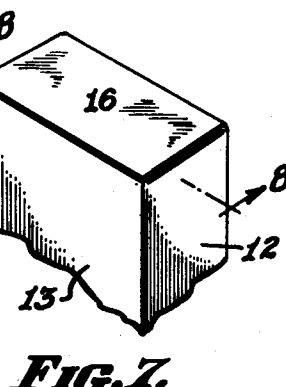
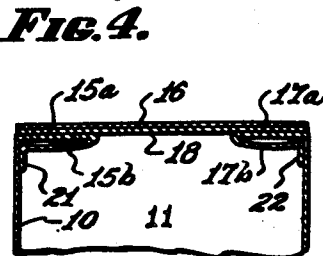
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2,491,278

SEAL-END CARTON

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SEAL-END CARTON

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My invention relates to seal-end cartons primarily, i. e. cartons in which the enclosing body walls are provided with flaps at their ends, which flaps are designed to be folded to produce an end closure and to be adhesively secured together.

The practical art has always encountered great difficulty in producing closed cartons of this type having tight closures on both ends. It is the usual practice to erect the tubular, knocked-down cartons and place them over a mandrel for making the first closure. The internal mandrel supports the flaps during the application of adhesive, and when the flaps are folded, they may be pressed together in a positive fashion between the mandrel and an external pressure element. In this way, with well-made and accurately cut cartons, a satisfactorily tight closure can be made.

But it will be obvious that after a carton has been closed on one end, and filled with its contents, an internal mandrel cannot again be employed. Hence, the flaps receive no support from beneath. They tend (especially the short or first-folded flaps) both to curl or warp and to bend inwardly. This interferes with the proper application of adhesive, and also keeps the flaps out of surface conformity, so that closures formed in this way are not tight.

The principal object of my invention is to provide a simple and inexpensive cure for these difficulties. This, and the more specific objects of my invention, which will be set forth hereinafter, or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that construction and arrangement of parts of which I shall now describe an exemplary embodiment.

Figure 1 is a plan view of one end of a blank for a seal-end carton constructed in accordance with my invention.

Figure 2 is a similar view showing an initial stage of folding and gluing.

Figure 3 is a plan view of one end of the tubed structure.

Figure 4 is a partial perspective view of the erected carton with parts cut away.

Figure 5 is a partial sectional view taken along the line 5—5 of Figure 4.

Figure 6 and Figure 7 are partial perspective views showing successive stages in closing the carton.

Figure 8 is a partial sectional view taken along the line 8—8 of Figure 7.

Briefly, in the practice of my invention, I provide a construction for the interior or first-folded flaps of a seal-end carton, such that these flaps hold themselves up, under very substantial resilient pressure, not only against any devices employed for the application of adhesive, but also against overlying flaps in the ultimate closure, so

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that all flaps become sealed together in surface conformity. This is accomplished, as hereinafter explained, by providing a construction resulting in the exertion of upward pressure on the normally free ends of these flaps, in the prevention of buckling or twisting in these flaps, and in the longitudinal tensioning of these flaps so that they are prevented from curling. All this is accomplished with little or no increase in the boxboard used, and with the addition of a manufacturing step which does not add greatly to the carton cost.

The novel construction hereinafter described may be applied to both ends of a seal-end carton, in which event mandrel sealing may be dispensed with. But since most carton users have carton filling and handling equipment using mandrels for the first closure, it is usually sufficient to provide my novel construction on but one end of the carton—the end intended for the last closure, and preferably the bottom.

Referring to Figure 1, I have shown a blank for a seal-end carton having enclosing body walls 10, 11, 12 and 13 and a glue flap 14 in articulation as is conventional. The body walls bear at their ends closure flaps indicated at 15, 16, 17 and 18. It will be understood that the size, shape and number of the body walls of the carton, and hence the size, shape and number of the closure flaps do not constitute a limitation on my invention; but in cartons of this general type there will be a flap, or usually a pair of flaps, which are to be folded first, and upon which the other closure flaps will ultimately rest. In a carton of rectangular cross-section, where one pair of body walls is broader than the other, the first-folded flaps are on the narrower body walls, and are incapable individually of extending across the end of the box. The first-folded flap or flaps, which in the exemplary embodiment herein illustrated are the flaps 15 and 17, are given a special construction in accordance with my invention.

These flaps are divided by transverse scores 19 and 20 into parts 15a and 17a lying next the body walls 10 and 12 respectively, and outer parts 15b and 17b. These in turn are provided with extending glue tabs 21 and 22 demarked by score lines 23 and 24. The depth of the parts 15a and 17a is that desired in the first-folded flaps of the finished box; and the depth of the parts 15b and 17b is greater by an appreciable amount.

As an initial operation in the forming of a box from the blank of Figure 1, the flaps 15 and 17 are folded along the score lines 19 and 20 so as to bring the glue tabs 21 and 22 against the body walls 10 and 12, to which these tabs are adhesively secured. This operation may be performed on the ordinary carton folding and gluing machines by

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passing the blanks through the machine in a direction transverse to the body walls. It requires no special apparatus so long as the glue tabs 21 and 22 extend beyond the edges of the flaps 16 and 18. It will be noted that the flap portions 15a and 15b and 17a and 17b remain unattached to each other. The result of the initial operation is shown in Figure 2.

The blank is then tubed by being set through a conventional carton folding and gluing machine in a direction longitudinal of the body walls. Walls 10 and 12 are folded over on the blank and the glue flap 14 is adhered to the marginal portion of wall 13. The result of the tubing operation is shown in Figure 3. The carton is now in collapsed or knocked-down condition and may be shipped to the user.

The carton may be erected by the user as indicated in Figure 4; and the operation of closing it may be carried on in the usual fashion. For example, as indicated in Figure 6, the flaps 15 and 17 may be folded inwardly, and the other flaps swung outwardly. Suitable adhesive can be applied to some or all of them, whereupon the intermediate flap 18 may be folded inwardly to cover the first-folded flaps and the outer flap 16 may be folded over to form the closure illustrated in Figure 7. This closure does not differ in external appearance from conventional closures.

But it will be evident from Figures 5 and 8 that as the flaps 15 and 17 are bent over, the under portions 15b and 17b of these flaps, being longer, assume a bowed configuration. Because of the resiliency of the board from which they are made, this keeps the upper portions 15a and 17a under tension and hence flat; and it prevents curling and buckling. Since the lines of attachment of the portions 15b and 17b to the body walls 10 and 12 is below the score lines at the tops of these walls, a bracing action occurs such as strongly to urge the flaps to the unfolded position. The resistance, and the resultant upward pressure of the flaps, become greater as the angularity of the fold is increased. Thus, when the closure is being made, the flap portions 15a and 17a are pressed strongly against the intermediate flap 18, producing complete surface conformity; and this upward pressure assists in bringing about surface conformity between the intermediate flap 18 and the outer flap 16. An external pressure element will be employed to hold the flaps together while the adhesive sets, but no internal mandrel is required.

If the score lines 23 and 24 are made to coincide with the score lines at the tops of the body walls 10 and 12, the actions hereinabove described do not occur. Moreover, the board tends to split at the score lines because of its relatively great combined thickness. Thus the score lines 23 and 24 must be spaced appreciably below the body wall score lines, but the exact spacing is capable of considerable variation. There will be found a particular spacing which produces maximum upward pressure upon folding, but this will vary with the length of the flaps, as well as the kind, thickness and resiliency of the board of which the cartons are made. As the spacing is increased beyond an optimum, the pressure upon folding tends to diminish. For cartons of medium dimensions and common board thicknesses, good results can be attained with spacings around $\frac{1}{8}$ inch, but this can usually be rather widely modified. As the carton size increases, I prefer to increase the spacing.

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Depending somewhat upon the size and shape of the cartons, it is possible to practice my invention without using any significantly greater quantity of board, as will be evident from the attached drawings. It should be remembered, in connection with first-folded flaps, that a relatively shorter one which has exact surface conformity with overlying flaps in a closure is greatly to be preferred to a longer one which does not. Moreover, the weight of board and carton size remaining the same, the upward pressure effects hereinabove described tend to diminish to some extent as the length of the folded flaps increases. Thus in most carton shapes it is possible to form first-folded flaps of my novel construction substantially within the confines of the blank size for a conventional seal-end carton of the same shape and dimensions.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention in an exemplary embodiment, what I claim as new and desire to secure by Letters Patent is:

1. A seal-end type carton having body walls and closure flaps integrally connected with said body walls along hinge lines, at least one closure flap having two spaced fold lines defining with the hinge line of said flap an outer portion initially coplanar to the body wall to which it is articulated along said hinge line, and an inner portion doubled upon the outer portion along one of said fold lines and in substantial face contact with said outer portion, the inner portion being secured to said body portion by means of a tab which is integrally connected to the inner portion along said second named fold line, said second named fold line being positioned below said hinge line, and said inner portion of said flap being longer than said outer portion, the inner portion being otherwise unsecured to the outer portion.

2. A seal-end type carton having body walls and closure flaps integrally connected with said body walls along hinge lines, an opposite pair of said closure flaps each having two spaced fold lines defining with the hinge line of said flap an outer portion initially coplanar to the body wall to which it is articulated along said hinge lines, and an inner portion doubled upon the outer portion along one of said fold lines and in substantial face contact with said outer portion, the inner portion being secured to said body portion by means of a tab which is integrally connected to the inner portion along said second named fold line, said second named fold line being positioned below said hinge line, and said inner portion of said flap being longer than said outer portion, the inner portion being otherwise secured to the outer portion.

3. The structure of claim 2 wherein said opposite closure flaps are connected to the smaller body walls of the carton.

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