My invention relates to cartons having for a bottom closure a series of closure flaps, one articulated to each main wall of the carton, which closure flaps are so configured that they may be interengaged and interlocked by a simple inserting motion after the flaps have been folded over in the correct order. Such cartons are useful for a variety of purposes and products, and are of commercial interest in instances where a relatively large number of cartons must be set up and closed on the bottom, by hand rather than by machine, and where the gluing of the bottom closure of a carton is impracticable or undesired.

A number of “snap-lock” cartons have been suggested in the past; but all of these have either been characterized by such an interengagement of the closure flaps as would permit racking or diagonal distortion of the bottom, or by such an interengagement of the flaps as would permit accidental and undesired opening of the carton by pressure of weight from within, or by both of these defects. Again, certain structures have been suggested which, while permitting interengagement of the bottom flaps, are incapable of acting automatically, i.e., of interlocking of themselves upon being displaced inwardly, but require extra manipulations of various kinds. In the art a “snap-lock” carton has such a structure that if the closure panels are folded over in a predetermined order, and the folded structure is pressed inwardly, it will upon release form an engaged bottom closure. It may be necessary in some instances to press the engaged panels outwardly, or to cause the inserted contents to do this; but in a “snap-lock” carton as understood in the art no other manipulations, such as the folding over or insertion of tabs or locking means, or the bending of flaps, are necessary. This is what I mean hereafter by the references to the automatic action of my cartons.

The primary object of my invention is the provision of a carton structure such that the interengagement of the flaps to form the locked bottom is not only easily and automatically effected, but when once effected provides a structure which is very much more resistant to opening than automatically acting structures heretofore produced, while at the same time it is not subject to racking. Since my carton does not have those defects, large boxes carrying heavy weights and weights unevenly distributed may be made in accordance with my invention. While I have spoken of cartons, it will be understood that my invention is not limited to containers of any particular size or containers made of any particular weight of board. Thus, the principles of my invention may be applied to cartons in the ordinary acceptance of that term where the cartons are made of any of the usual weights of box board or to shipping containers made of very much heavier boards and usually of pasted boards.

The primary object of my invention as set forth, and other objects which will be indicated hereinafter or will be apparent to one skilled in the art upon reading the specification, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference may be made to the drawings wherein:

Figure 1 is a plan view of a blank showing the bottom closure members and at least portions of the side walls of the carton.

Figure 2 shows the blank in knocked-down, glued conditions.

Figure 3 is a perspective view with portions cut away showing the inside interengagement of flaps forming the bottom closure.

Figure 4 is a perspective view of the squared carton preparatory to closing.

Figure 5 is a bottom perspective view of the carton showing the interengagement of the flaps as apparent from the outside.

A snap-lock construction, such as that to which my invention is addressed, is primarily useful in effecting the closure of but one end of the carton, as will be readily understood. It could be used on both ends of the carton but only in the event the carton was set up and closed while in unfilled condition or in the event that the carton was filled with some highly compressible substance.

This is because the snap-lock action requires a considerable inward depression of the several interengaged flaps. If the carton were filled and closed on one end, such an inward depression would usually be prevented by the contents of the carton. Consequently, such closures are employed for the most part only on one end of the carton, which end is the end closed first and is, therefore, usually the bottom. The nature of the closure on the other end of the carton is not a limitation upon my invention and I have, therefore, illustrated no closure for the other end.

In Figure 1, I have shown a carton blank cut and scored to have main wall portions A, B, C and D which may be of any length appropriate to the uses to which the carton is to be put. There is likewise in my invention no limitation as to the relative width of the side walls of the carton. The side walls may be of equal widths giving a square carton when erected, or of quite unequal
widths giving an erected rectangular carton. Since the closure is effected by the interengagement of bottom flaps, the weight of the board will be chosen in accordance with the weight and nature of the contents of the carton in a manner known in the art. I have shown the side walls as having articulated to it a glue flap E. Bottom flaps are indicated respectively at F, G, H and I.

The carton will be folded into a flat, tubular knockdown formation with the flap E adhered by glue or stitching to the wall A as is usual in carton manufacture. This condition is illustrated in Figure 2. Before use, the carton will be squared up as shown in Figure 4. Thereupon, the bottom closure flaps will be unfolded.

It will be noted in the several figures that the flaps G and I are triangular in general configuration. In the diagonal edges of these flaps there are notches 1 and 2 for a purpose hereinafter to be discussed. The flap H has inwardly inclined side edges 3 and 4, terminating at points 5 and 8, beyond which the edges are formed acutely outwardly as at 7 and 6, and the flap is extended outwardly to form a tongue 9 substantially wider than the narrowest width elsewhere of the flap H. The flap F is a rectangular flap; but is characterized by a cut-out 10 intermediate its edges and having a length substantially equal to the distance between points 5 and 6 of flap H. The configuration of flaps F and H is such that points 5 and 6 will lie along the base of the cut-out 10, and substantially midway of the carton bottom. It will be noted also that the edge of notches 1 and 2 which lies toward the outer end of flaps G and I is curved.

In closing the carton, the flap F is first folded inwardly. Triangular flaps G and I are then folded inwardly over flap F, and finally flap H is folded inwardly over flaps G and I. The structure is then locked by pressing inwardly at the center of the bottom so as to depress the walls until the outer edge of the extension or tongue 9 passes inwardly beyond the outer edge of flap F. The inward pressure is then released and the flaps tend to spring outwardly into locked position.

The substantially straight edges of the cut-out 10 permit flaps H and F to come outwardly into the plane of the bottom of the carton, the points 5 and 6 riding along the edges of the cut-out 10. The bottom of the carton remains closed because the tongue 9 of the outermost flap H is now engaged beneath the body of the innermost flap F. This prevents the bottom from opening because of the resiliency of the walls; but the interengagement thus far described does not prevent the bottom from opening in response to outward pressure from within the carton.

The diagonal side edges of flaps G and I are so disposed as to lie somewhat inwardly of the points 5 and 6 of flap H when the carton is closed. It is thereby necessary for the points 5 and 6 to engage substantially in the bases of the notches 1 and 2, as shown most clearly in Figure 5. The diagonal edges of the flaps G and H are so placed that when the several flaps are forced inwardly, the points 5 and 6 of flap H will pass them. The forward curving edges of the notches 1 and 2 permit the points 5 and 6 of flap H to ride down into the engagement aforementioned, without jamming and without distortion of flaps or flap parts. There may be, and in instances preferably will be a slight binding either overcome by the weight of the contents or by a slight pressure from within. But when the engagement is effected as in Figure 5, the flaps are securely interlocked, the carton bottom is prevented from opening outwardly, and racking or diagonal distortion of the carton bottom is likewise prevented. Yet the interlocking action occurs automatically. Containers for heavy duty using my locking device may be strengthened against high internal weights by increasing the depth of the shoulders 11 and 12 on panels A and C. Such an increase of the depth may cause the points 5 and 6 on the flap H to bind sufficiently so that the flaps will not spring outwardly of their own accord; but by means of a slight outward pressure from inside, applied by the fingers, or by the contents of the box, the points 5 and 6 on panel H will easily slide along shoulders 11 and 12, and thus lock the bottom.

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

In a closure for tubular cartons having four walls, closure flaps articulated to each of said four walls, one of said flaps being substantially rectangular in shape, extending somewhat beyond the median line of the bottom of the carton, and having a cutout centrally located in the edge opposite its line of articulation with a base lying substantially along said median line and side edges substantially normal to said base, the juncture of said side edges and base forming corners, an adjacent flap having its forward portion cut along a diagonal line so that said flap has substantially a triangular configuration, said diagonal line adapted to lie inwardly of a corner of the cutout in said first mentioned flap, said second mentioned flap having a notch in said diagonal edge with a corner substantially coinciding with a corner of the cutout in said first mentioned flap, the forward edge at least of said notch being formed acutely to permit interlocking engagement without binding as hereinafter set forth, a third flap adjacent said second flap, and of a length to bring its end beyond said median line of the bottom of said carton, the sides of said third flap having notches with rounded shoulders on the part projecting beyond said median line, the bases of the notches having substantial coincidence with the corners of the cutout in said first mentioned flap when said flaps are folded over, and a fourth flap having a configuration similar to the configuration of said second flap but of opposite hand, the said construction of said flaps being such that when said first flap is folded over, said second and fourth flaps folded over on it, and said third flap folded over on said second and fourth flaps, and said folded structure depressed inwardly of the carton, the outer edge portion of said third flap will pass the outer edge portion of said first flap and the diagonal edge portions of said second and fourth flaps, and upon relief of the inward pressure the flaps will spring outwardly into interlocked condition, with said several notches in engagement, with the outer end of said third flap engaged beneath said first, second and fourth flaps, and with the notches on said third flap engaged in the corners of the cutout of said first flap, whereby a structure is produced not susceptible to racking.

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