

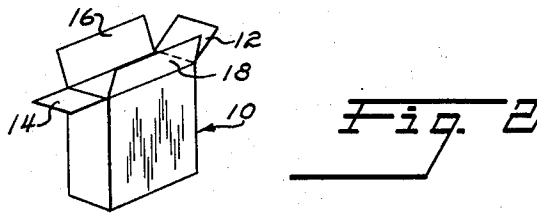
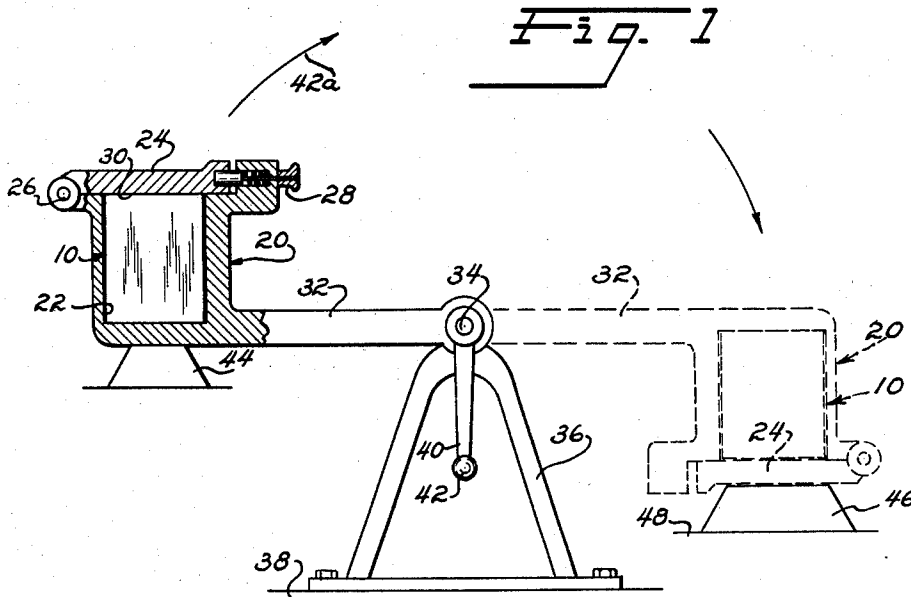
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CARTON SEALING

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CARTON SEALING

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This invention relates broadly to the art of carton sealing and more particularly to a method of sealing the open end of a filled carton of the folding flap variety.

In the sealing of filled cartons or other receptacles having adhesive carrying flaps which are mutually overlapped to close the open end of the carton difficulty is encountered in applying extensive sealing pressure to the flaps where the cartons contain such yieldable substances as dried cereal, sugar, flour or the like. Since yielding substances of this type cannot satisfactorily oppose external sealing pressure, the flaps have a tendency to be pushed inwardly so that a uniform sealing pressure is not applied thereto, resulting in unsealed gaps or slits in the top of the carton through which the packaged substance may sift to cause insanitary conditions and annoyance to sellers and consumers. The fact that cartons of the above type are generally only partially filled also makes it difficult to obtain a satisfactory seal.

An object of the invention is the provision of a novel method for sealing flapped cartons which overcomes the unsatisfactory conditions referred to above.

Another object of the invention is the provision of a novel method for applying sealing pressure to adhesive carrying flaps of filled cartons which is effective to provide a uniform hermetic seal with a minimum expenditure of time and effort and without damage to the carton or its contents.

A more specific object of the invention is the provision of a novel flap sealing method for cartons which utilizes the inertia of the carton contents to provide an outwardly directed sealing pressure which is effective to force the flaps together into sealing engagement.

Still another object of the invention is the provision of a novel flap sealing method for cartons which depends on the inertia of the carton contents to effect sealing engagement of the adhesive carrying folded flaps and thereafter utilizes the weight of the contents to maintain the flaps in sealing engagement until the adhesive sets.

Other objects and their attendant advantages will become apparent when the following detailed description is read in conjunction with the accompanying drawings wherein:

Fig. 1 is a simplified diagrammatic view of a form of apparatus which serves to illustrate the principles of the method of the present invention, and

Fig. 2 is a perspective view of a typical flapped carton to which the method of the present invention is applicable.

The method of the present invention is dependent upon the utilization of the inertia of the contents of a carton to provide an internal sealing force to act outwardly against folded, adhesive carrying flaps of the type of carton illustrated in Fig. 2. In order to effectively utilize this inertia, tests have shown that when the carton is suitably supported with adhesive coated flaps folded in their position of closure and in engagement with a plane surface of a movable impact member, when this member carrying the carton is moved vertically at a suitable veloc-

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ity against an anvil, or is suddenly decelerated, the force of inertia of the contents within the suddenly-stopped or decelerated carton is sufficiently great to impart an internal outwardly acting sealing pressure uniformly against the flaps which effects a close sealing engagement thereof. Preferably, the carton is supported so that it approaches the point of impact or sudden deceleration in an inverted position with the arrangement being such that precisely at the moment of impact the carton is moving in a true vertical direction downwardly so that the force of inertia of the contents will apply a uniform pressure evenly over the entire internal area of the innermost folded flaps. If found necessary to effect a satisfactory seal, the above operation can of course be repeated. After the impact, the carton can remain in its inverted position a sufficient time so that the weight of the contents can continue to act on the flaps to maintain them in sealing engagement until the adhesive sets.

Fig. 1 illustrates a rudimentary mechanism which may serve to effect inertia sealing of carton flaps in accordance with the above described principles. A carton 10 illustrated in Fig. 2 is provided with the usual closure flaps comprising two small end flaps 12 and 14 and two elongated side flaps 16 and 18. The carton is filled with its intended contents and thereafter adhesive substance, referred to with more particularity hereinafter, is applied to one or both of those surfaces of the flaps which, when the flaps are in their position of closure, will be engaged by an adjacent flap surface. For example, adhesive could be applied to the inner surface of the end flaps 12 and 14, to the outer surface of a side flap such as flap 16, and to one or both surfaces of the opposite side flap 18. The flaps are then folded in their position of closure with side flaps 16 and 18 innermost, and the end flaps 12 and 14 folded over the outermost side flap.

The carton may then be placed in the mechanism of Fig. 1 which as illustrated may comprise a carton holder 20 having a carton receiving cavity 22 only slightly larger than the carton 10 so that in the subsequent sealing operation the contents of the carton will not bulge the sides of the carton outwardly. The cavity 22 may be closed by a suitable lid 24 having a hinge 26 integral with the top of the holder and the lid may be latched in its closed position in any suitable manner such as by means of the manually operable spring pressed plunger latch 28 illustrated. When the lid 24, which may be considered an impact member, is in its closed position it provides a plane surface 30 which bears on the flaps of the carton but with only sufficient pressure to retain the flaps in their approximate position of closure.

The holder 20 is integral with an elongated arm 32 which is pivoted at 34 atop a suitable pedestal 36 fixed to a suitable horizontal surface 38. A lever 40 is fixed to the pivot 34 of the arm 32 and may be equipped with a handle 42 to form a crank by means of which an operator may rotate the arm 32 and holder 20 clockwise about the pivot in the direction of the arrows 42a.

In the initial position of the mechanism shown in full lines in Fig. 1 the holder 20 may be supported in a horizontal position of rest on a suitable support 44. On the opposite side of the pedestal 36 is an impact anvil 46 supported on a suitable horizontal surface 48 and preferably in a position with respect to the pivot point 34 of the holder 20 that when the holder is rotated to the dotted line position of Fig. 1 into engagement with the anvil the longitudinal axis of the holder 20 is normal to the horizontal plane of the upper surface of the anvil.

When the flaps of the carton 10 are to be sealed the flaps are coated with a suitable adhesive and the carton is placed in the cavity 22 and the lid 24 is closed and latched. The operator then rotates the holder clockwise by means of the crank to bring the outer surface of

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the holder lid, with the carton flaps abutting the opposite sides of the lid, against the anvil 46 with sufficient velocity to cause the inertia of the carton contents at the moment of impact to effect sealing pressure on the adhesively coated flaps. Since at the exact moment of impact the holder is traveling in vertical downward direction, the inertia forces of the contents are distributed evenly over the internal surface of the flap or flaps adjacent the contents so that a uniform sealing force is imparted to the sealing surfaces.

After the initial impact with the carton now inverted as shown in Fig. 1, the carton may be left in this position a sufficient time to allow the weight of the carton contents to act on the flaps to maintain them in sealing engagement until the adhesive sets. Thereafter the carton may be removed and the process repeated for succeeding cartons.

With regard to the adhesive used in connection with the above described process it may be one of several types such as an adhesive having a high tack and which sets quickly and has the property of flowing, or one having regular heat sealing characteristics which is activated prior to inverting the carton and moving the holder against the anvil. It will be understood, of course, that the flaps at the opposite end of the carton may be sealed in a more conventional manner as by means of a mandrel inserted into the carton with the subsequent application of pressure in order to effect sealing engagement between the flaps of the carton.

The above described inertia sealing of flapped cartons has been found to be entirely effective even when using such light weight substance as a dried cereal commonly known as "puffed rice." It should be understood, of course, that the apparatus described herein is exemplary only and that the method of imparting a sealing force by utilizing the inertia of the package contents is susceptible of being performed in a variety of ways and is not intended to be restricted precisely to the method described herein. For the limits of the invention reference must be made to the appended claims.

What is claimed is:

1. The method of sealing filled cartons having flaps for closing the open end thereof comprising the steps of applying an adhesive substance to the surfaces of the flaps which will be adjacent each other when said flaps are in their position of closure, folding said flaps into their positions of closure, positioning said closed flaps against a plane surface of a movable impact member to maintain said flaps in closed position, and moving said impact member with the carton against a stationary anvil at a velocity which causes the inertia of the contents of said carton upon the sudden stopping thereof to exert a sealing pressure against the closed flaps of said carton.

2. The method of sealing filled cartons having flaps for closing the open end thereof comprising the steps of applying an adhesive substance to the surfaces of the flaps which will be adjacent each other when said flaps are in this position of closure, folding said flaps into their positions of closure, inverting said carton so that said closed flaps engage a plane surface of a movable impact member to maintain the flaps in closed position, and then moving said impact member with the carton against a stationary anvil at a velocity which causes the inertia of the contents of said carton upon the sudden stopping thereof to exert a sealing pressure against the closed flaps of said carton.

3. The method of sealing filled cartons having flaps for closing the open end thereof comprising the steps of applying an adhesive substance to the surfaces of the flaps which will be adjacent each other when said flaps are in their position of closure, folding said flaps into

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their position of closure, confining the walls of said carton to prevent their bulging during the sealing process, positioning the plane surface of an impact member over the folded flaps to hold the flaps in closed position, then moving said confined carton and said impact member in unison to engage said member with a stationary anvil at a velocity which causes the inertia of the contents of said carton, upon the sudden stopping thereof, to exert a sealing pressure against the closed flaps of said carton.

4. The method of claim 3 wherein said carton and said impact member are moved vertically downwardly against said anvil.

5. The method of claim 2 and including the additional step of retaining said carton in its inverted position to allow the weight of the contents of said carton to retain said flaps in sealing engagement until said adhesive has set.

6. The method of sealing a filled carton having adhesively coated foldable flaps for closing the open end thereof, comprising the steps of folding the flaps in overlapping relationship with the adhesive coating therebetween, inverting the carton to distribute the contents thereof substantially uniformly above the inner surfaces of said folded flaps, accelerating said carton downwardly, and suddenly stopping the downward movement of the carton with the outer surfaces of said flaps in engagement with a plane surface, the rate of deceleration of the carton due to said stopping being sufficient to cause the contents of the carton to exert an inertia force against the inner surfaces of said flaps sufficient to effect a seal therebetween.

7. The method of sealing a filled carton having adhesively coated flaps for closing the open end thereof, comprising the steps of folding the flaps in overlapping relationship with an adhesive coating therebetween, positioning the folded flaps against the plane surface of a movable impact member with the carton in one position, accelerating the carton and impact member to move the member and carton bodily along a path from said one position to a point of impact with said end of the carton leading and the opposite end of the carton trailing while maintaining said folded flaps against the plane surface of the member, and suddenly decelerating the member at the point of impact at a rate which causes the contents of the carton to exert an inertia force on the closed flap sufficient to effect a seal therebetween.

8. The method of claim 7, wherein said sudden deceleration is effected by engagement of said accelerated impact member with a stationary anvil.

9. The method of sealing a filled carton having adhesively coated foldable flaps for closing the open end thereof, comprising the steps of folding the flaps in overlapping relationship with the adhesive coating therebetween, rapidly accelerating the carton downwardly to move the carton bodily along a path from one position to a point of impact with said end leading, and suddenly stopping the movement of the carton at the point of impact with the outer surfaces of said flaps in engagement with a plane surface, the rate of deceleration of the carton during said stopping being sufficient to cause the contents of the carton to engage the flaps at said end and exert an inertia force against the inner surfaces of said flaps sufficient to effect a seal therebetween.

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