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CARTON LOCK

Filed June 2, 1960

Fig. 1

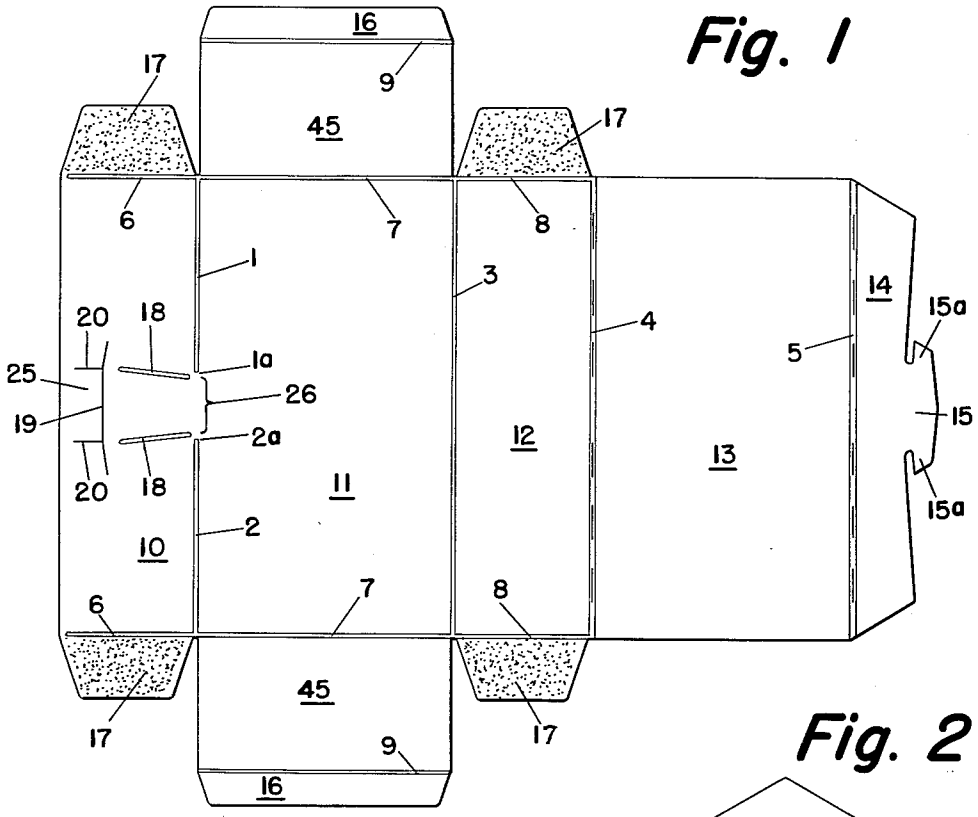


Fig. 2

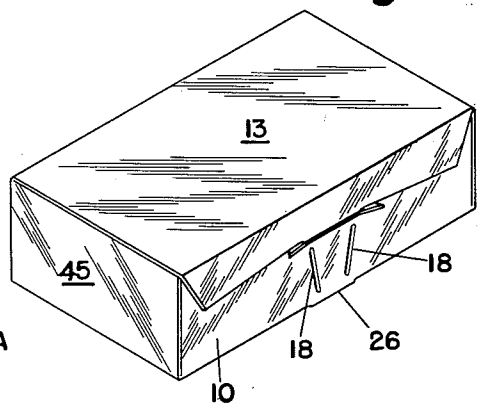


Fig. 3

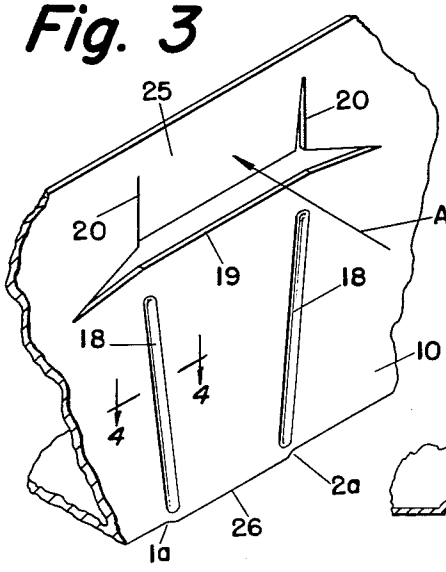
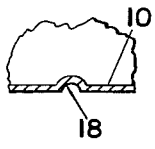


Fig. 4



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CARTON LOCK

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This invention relates to an improved locking construction for a carton, in which opposed panels or walls of the carton are engaged together in a manner to substantially prevent their subsequent disengagement without mutilation of the carton forming material. Because such a locking operation is, as a matter of economic necessity, frequently required to be performed by high speed automatic equipment, it is essential that the locking operation be accomplished in a manner which does not interfere with the speed of operation and results in a lock having the desired characteristics. One problem which arises in a performance of this locking operation is caused by the relative flexibility of the paperboard material from which the carton is most commonly constructed, the paperboard being sufficiently flexible so that stability of the members to be engaged is frequently inconsistent.

It is the principal object of this invention to provide an improved form of locking construction which imparts a greatly improved stability and flexibility to the carton material in the area of the locking elements, and to insure automatically positioning of the locking elements so that locking engagement is made certain. Other particular objects and advantages of the invention will become clear from the following description in connection with the appended drawings, in which:

FIGURE 1 is a plan view of a carton blank incorporating a preferred embodiment of the invention;

FIGURE 2 is a perspective view of a set-up carton made from the blank of FIGURE 1;

FIGURE 3 is an enlarged perspective view partially cut away, of the female locking element of the carton as it is set up in position for locking engagement; and

FIGURE 4 is a cross sectional view taken along the lines 4—4 of FIGURE 3.

Referring first to FIGURE 1, the carton blank of this invention is made from a suitable material of foldable yet relatively stiff composition, such as paperboard, plastic, various laminated materials and the like. A preferred material, commonly employed, is paperboard having a thickness of from about .010 inch to .030 inch. The blank is suitably cut and scored along the hinging score lines **1** to **9** inclusive to provide a series of walls, panels and flaps including front wall or panel **10**, bottom wall **11**, rear wall **12**, top or cover wall **13**, locking panel **14**, end walls **45**, dust flaps **16** and glue flaps **17**. Locking panel **14** has formed on the remote edge thereof an arrow-shaped male element **15** having laterally spaced locking barbs **15***a* at the lateral termini thereof. Front wall **10** has a female locking element formed therein by longitudinal cut lines or slits **20** and lateral cut line or slit **19**, the area **25** defined by these cut lines providing a deflectable portion the function of which will be explained later herein. Positioned below (FIGURE 2) female cut line **19** is a pair of score lines **18**, these score lines being positioned so that their upper ends terminate adjacent the lower ends of cut lines **20** and their lower ends terminate adjacent the inner ends of hinging score lines **1** and **2**.

The aforementioned score lines dividing the walls and panels from each other provide a hinging relationship of these structural elements, so that the carton may be conventionally set up as shown in FIGURE 2. In this position, walls **10**, **12** and **45** are erected perpendicularly to bottom wall **11**, with glue flaps **17** folded inwardly into superposed position with respect to the inner surfaces of walls **45**, to which they may be attached by suitable adhesives as indicated in FIGURE 1, by staples, or by any other suitable means. Obviously, a conventional locking construction whereby flaps **17** were engaged with walls **45**, alternatively could be employed. Dust flaps **16** are then folded to overlie bottom wall **11**, and cover wall **13** is folded over to close the open top of the receptacle previously formed.

Referring also to FIGURE 3, it will be seen that as front wall **10** is erected perpendicularly to bottom wall **11**, such as by a force A applied to wall **10**, score lines **18** will provide in effect a stiffening strut, serving to assist in the resistance to this folding motion of the portion of front wall **10** in the immediate vicinity of score lines **18**. The interruption **26** in the score line hinge connecting wall **10** to wall **11**, provided by the spacing beyond cut line **19** between score lines **1** and **2**, further increases the resistance of this portion of front panel **10** to the folding movement. The presence of female cut line **19** prevents this resistance effect from extending therebeyond into the area **25** of front wall **10** above cut wall **19**, so that as the pressure is applied to erect front wall **10** a natural opening of the female locking element results, as graphically illustrated in FIGURE 3.

This automatic full opening of the female locking element provided by slit **19**, and increased in magnitude by the presence of slits **20** presents a degree of entrance area which insures the entrance of male locking element **15**, even under conditions of highest speed machine operation, as cover wall **13**, with locking panel positioned substantially perpendicularly thereto, is brought into position to close the carton. After release of the plow or other means by which wall **10** is erected perpendicularly to wall **11**, locking means **15** having just been inserted, the natural resilience of the carton material in the area **25** and in the area laterally just beyond cut lines **20** causes that area to attempt to snap back, and thus assures engagement of the edges of barbs **15***a* behind the terminal edges of slit **19**, for positive locking engagement of panel **14** to wall **10**. It will be seen that with respect to the direction of entrance of element **15** into cut line **19**, score lines **18** lie beyond the female cut **19**.

FIGURE 4 shows in enlarged section the strut forming characteristic of score lines **18**, by which a significant stiffness is imparted to wall **10** to facilitate opening of the female locking means as previously described.

Having now described a preferred embodiment of the invention, it is to be understood that the obvious modifications thereof which will be apparent to those skilled in the art are also intended to be included within the scope of this invention, and that the invention therefore is to be limited only as set forth in the appended claims.

We claim:

1. A carton including a pair of opposed panels to be locked together, a wall member to which one of said panels is integrally connected along a hinge line defined by a line of weakness by which said one panel may be resistably hinged to lie at a substantial angle relative to the wall member, locking means comprising a pair of laterally spaced male members on the other of said panels and female means in said one of the panels comprising a laterally positioned cut line the edges of which are adapted to engage edges of said male members for locking enagement therewith, said hinge line being provided by a score line which is discontinuous in at least part of the area beyond said female cut line, the carton also including stiffening means integrally formed into said one panel beyond said cut line and adapted to facilitate open-

ing of said female locking means by planar separation of the portions of said one panel lying to opposite sides of said cut line for engagement therein of the male locking means upon the hinging of said one panel relative to said wall member, said stiffening means comprising a pair of spaced, longitudinally directed score lines impressed into said one of the panels in the area between said female cut line and said discontinuity of the hinge score line.

2. A carton according to claim 1, in which the terminal ends of said stiffening score lines adjacent the female cut line are positioned intermediate the ends of said female cut line.

3. A carton according to claim 2, further including a pair of spaced, longitudinally directed cut lines extending from and connected with said female cut line intermediate the ends thereof, said pair of cut lines extending in the direction away from said hinging score line.

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