Aug. 28, 1956 A. C. FRITZ 2,760,710

CARTON LOCKING DEVICE

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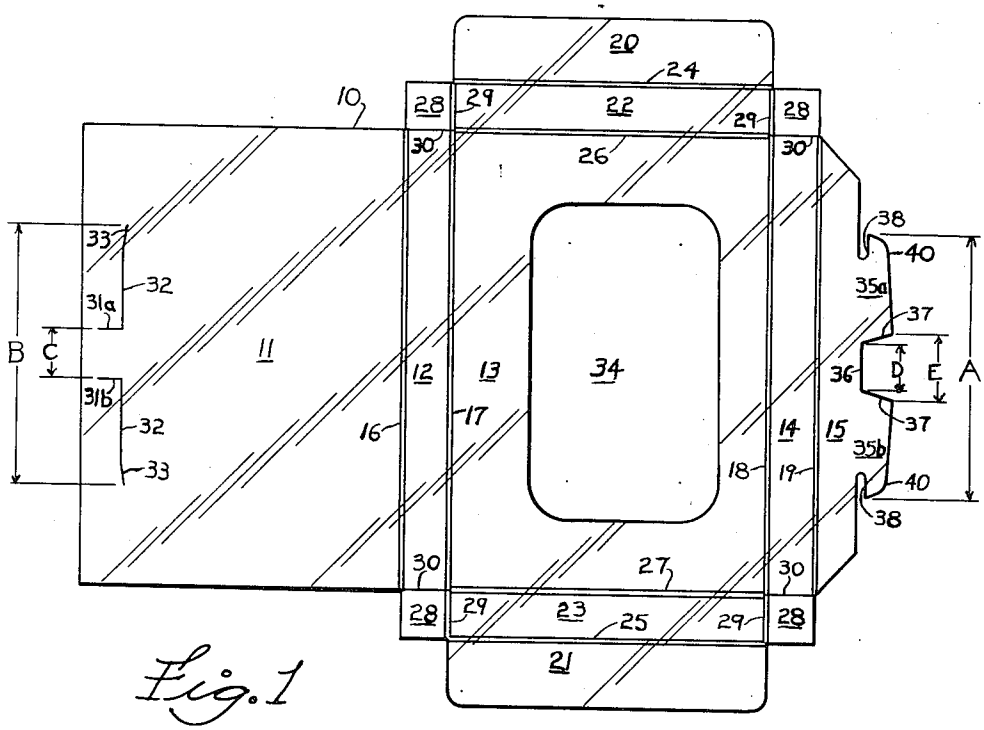


Fig. 1

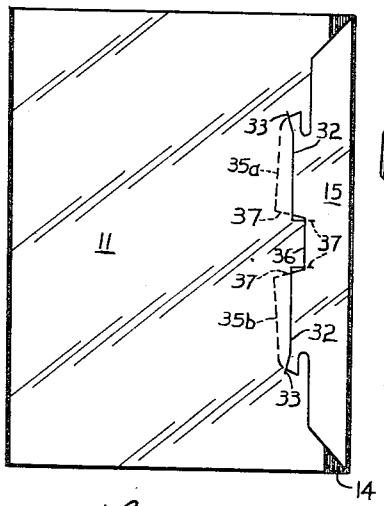


Fig. 3

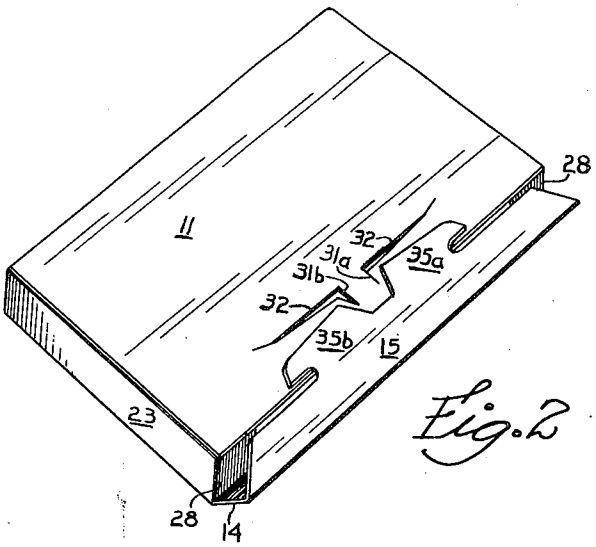


Fig. 2

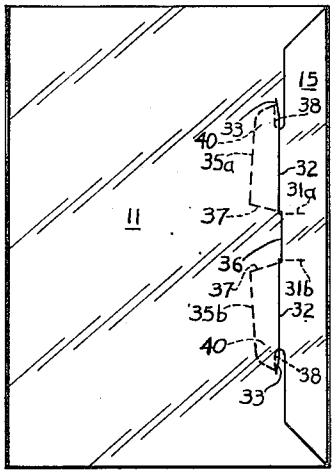
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Fig. 4



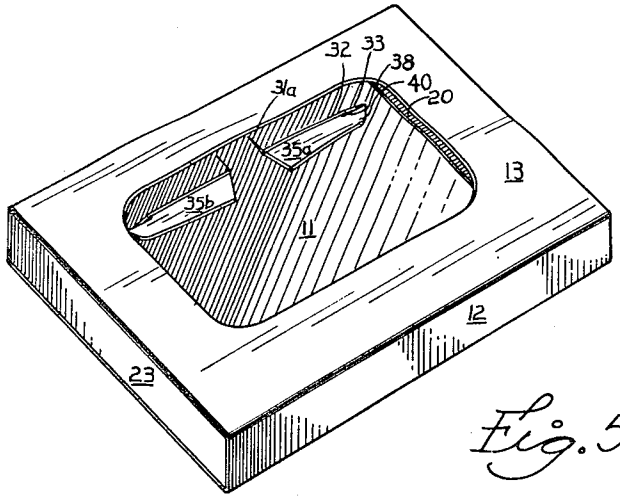


Fig. 5

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CARTON LOCKING DEVICE

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2 Claims. (Cl. 229—45)

This invention relates to an improved form of locking means for cartons or boxes and the like commonly made from paperboard or similar material. As is well known, paperboard cartons or boxes are used in quantities of many billions each year, and in a large proportion of such uses it is desirable that an adhesive not be used, or at least not used in certain portions of the construction where none the less a secure closure is required. To obtain such a closure, a number of various locking means have been devised, to suit particular purposes and for use with particular qualities of carton material.

One of the general types of locking means thus devised is commonly known in the carton industry as an "arrow" lock, the name arising from the fact that the male member of the locking means commonly has a substantially arrow-like shape and appearance.

My invention relates to a lock of the type which might be considered an "arrow" lock, although it provides a certain utility previously unknown in this field. It is frequently very desirable that an arrow or other lock in a particular usage provide a firm attachment or closure, with neither side nor end play of the portions locked together. However, it has been inherent in arrow-type locks that a large degree of side play is permitted. This is because the leading portion of the arrow-like member has a lateral dimension greater than that of the portion immediately following, and since it is the leading portion which must pass through the complementary locking slit on the other member, side play results when the fully locked position is reached with the narrower portion lying within the slit.

My inveniton includes a considerable modification of the arrow-type lock, resulting in elimination of this side play, and providing a locking means which give a firm and secure attachment or closure.

The construction by which I provide this improvement will be readily apparent from the following description and accompanying drawings, in which:

Figure 1 is a plan view of a paperboard blank for making a carton embodying my invention,

Figure 2 is a perspective view of a carton set up from the blank shown in Figure 1, in a preliminary stage of the locking operation,

Figure 3 is a bottom view of the carton shown in Figure 2, with the locking operation in an intermediate stage,

Figure 4 is a bottom view similar to Figure 3 showing the carton with the lock completely engaged, and

Figure 5 is a top perspective view, showing the erected carton, and showing the completely-engaged lock as viewed from the inside of the carton.

Referring first to Figure 1, the carton may be made from a single paperboard blank **10**, suitably cut and scored to provide a bottom wall or panel **11**, a rear wall **12**, a top wall **13**, a front wall **14** and a locking flap or panel **15** opposed to panel **11**, these walls and flaps in order being hingedly separated from each other along score lines **16**, **17**, **18** and **19**, respectively. Dust flaps **20** and **21** are hinged to side walls **22** and **23** along score lines

24 and **25**, the side walls in turn being hingedly connected to the side edges of top wall **13** along score lines **26** and **27**, all respectively.

Dust tabs **28** are hingedly connected to the side edges of side walls **22** and **23** along score lines **29**, and are separated from rear and front walls **12** and **14** by cut lines **30**. Adjacent the free edge of bottom panel **11** and extending toward panel **15** (Figure 2) is a pair of parallel, longitudinally situated spaced slits or cut lines **31***a* and **31***b*, to the inner ends of which is connected a pair of transverse, laterally-spaced slits or cuts **32**. Each of slits **32** terminates at its remote end in a rearwardly angled portion **33** extending away from the free end edge of panel **11** and away from panel **11** as seen in Figure 2 with the carton ready for locking. A window such as at **34** may be cut from top wall **13**, and if desired this window may of course be covered by cellophane or other transparent material. The free end edge of the locking panel **15** has the male or arrow-like locking member formed thereon and divided into two parts comprising a pair of half-arrow members **35***a* and **35***b*. Members **35***a* and **35***b* are laterally spaced or separated by a cut out portion defined by transverse cut out line **36**, and generally longitudinal lines **37** defining the side edges of the space. The outer ends of the locking members **35***a* and **35***b* have hook-like portions **40** formed thereon by locking slots cut therein by curved cut-out lines or edges **38**. Aligned slits **32** are substantially parallel to members **35***a* and **35***b*, that is, the slits are substantially parallel to lines drawn simultaneously through similar points on each of members **35***a* and **35***b*.

The overall width A of the arrow-like locking member is substantially equal to the distance B between the remote ends of female slits **32**, **33**. The distance C between the inner ends of female slits **32** is substantially equal to the length D of line **36** and substantially less than the distance E between the remote ends of boundary cut lines **37**; that is, the lateral dimension of the space between male members **35***a* and **35***b* at the free end edge of the locking panel is greater than the lateral dimension of the space at the inner boundary of the space (along line **36**), the first of these lateral dimensions being greater than and the second equal to the distance between slits **32**.

The carton is set up as shown in Figures 2, 3, 4 and 5, with walls **12**, **14**, **22** and **23** erected perpendicularly to top wall **13**, tabs **28** erected parallel to and inwardly of walls **12** and **14**, and panel **15**, flaps **20** and **21** and bottom panel **11** parallel to top wall **13**.

The engaging operation for my lock is performed as shown in Figures 2 and 3. Locking panel **15** is brought over the free end edge of bottom panel **11**, whereupon a slight downward pressure on the members **35***a* and **35***b* of the male locking member will press on the areas of panel **11** bounded by slits **31***a*, **32** and by **31***b*, **33** to cause an opening of slits **32**, **33**, as shown in Figure 2. Referring additionally to Figure 3, members **35***a* and **35***b* may then be pushed inwardly through slits **32**, **33**.

It will be noted that the edges defined by slits **31***a* and **31***b* engage the edges of biased boundary lines **37**, thus acting as a guide for the entrance of the male locking member. Referring particularly to Figure 3, it will be seen that the angle or curvature in slits **32**, **33** cooperates with the curved leading edge of male members **35***a* and **35***b* to produce easy entrance of the male members. As the lock nears complete engagement, with the ends of boundary line **36** snug against the inner ends of slits **32**, the equality of the distances C and D results in an exact centering of the male portion of the lock with the female portion, and in the completely engaged lock results in complete elimination of possible side play of the male member and locking panel **15** with respect to the female member and bottom panel **11**.

As the engaging operation is continued to the position shown in Figure 4, the natural resilience of the carton material results in an attempt by the portions of bottom panel **11** lying to each side of slits **32, 33** to spring back to lie in a single plane, and this tendency results in a pressure slightly bending the remote, free hook-like portions **40** of male members **35***a* and **35***b* inwardly of the carton beneath panel **11**. Upon release of the lock-engaging pressure, the male portion will spring back very slightly, with the remote free portions **40** lying inwardly and slightly forwardly (toward the free end edge of panel **11**) of slits **33** and with the edges **38** of male members **35***a* and **35***b* engaged with the edge presented by slits **32** and **33** substantially at the juncture of those slits (Figure 5). The slight springing back of the male members **35***a* and **35***b* is insufficient to have any material effect upon the snug engagement of edges **37** with the inner edges of cuts **31***a* and **31***b*. A snug, firm lock is thus provided, effectively free of side play of locking panel **15** with respect to bottom panel **11** and substantially free of end play of these two elements with respect to each other.

The firmness of the lock I have provided adds materially to the strength and security of the carton as a whole, and further provides the highly desirable feature of a tamperproof closure. It will be readily noted that the completely-engaged lock cannot be reopened without considerable mutilation of the carton material adjacent the lock. Consequently, and this is particularly important when foodstuffs are to be packaged, the carton cannot be opened and the contents handled or tampered with without a subsequent inspection revealing the prior occurence of such activity. This is a valuable protective feature for foodstuffs and other materials openly displayed in a grocery or other store.

Although but one embodiment of my invention has been illustrated and described, obvious modifications and variations in my invention might readily be made without departing from the spirit thereof. For example, slits **31***a*, **31***b* could be eliminated or boundary lines **37** made parallel and strictly longitudinal without destroying the operativeness of the lock, though there would result a marked decrease in the facility with which the lock could be engaged. Similarly, angled cuts **33** could be eliminated, with a mere decrease in the tenacity of the locking engagement. Other modifications may readily be envisaged. It is therefore to be understood that no limitations upon my invention are intended except as are set forth in the appended claims. It is further obvious that, although the claims for definiteness describe my lock as used in a carton, the lock will work quite as well for such articles as bands or collars and the like, such as shirt bands and similar articles, and such use is intended to and obviously should be covered by the claims.

I claim:

1. Locking means for a carton, the carton including a pair of opposed panels to be locked together, the locking means comprising a pair of laterally spaced male members formed on one of said panels, each of said male members having a hook-like portion formed on its laterally remote end, and female means in the other of said panels including a pair of laterally spaced, aligned slits, said slits being positioned parallel to a line drawn simultaneously through a similar point on each of said hook-like portions, the adjacent ends of said aligned slits each having one of a pair of cut lines connecting therewith and extending toward said one panel, the spacing between said male members being defined by a pair of cut lines and at the inner boundary thereof being substantially equal to the spacing between said slits, said slits and first-mentioned cut lines defining portions in the other of said panels adaptable for depression upon pressure of said male members thereupon for ready opening of said aligned slits for entrance of the male members and consequent engagement of the locking means, the remote end of each of said aligned slits being angled away from said male members to cause engagement of said hook-like portions beneath the other of said panels for positive security of the lock upon engagement of said locking means.

2. Locking means according to claim 1, wherein the cut lines connecting with said aligned slits are substantially parallel to each other and perpendicular to said slits, and the cut lines defining the spacing between said male members are divergent from each other in the direction away from said one panel, the spacing between said male members at the free end edge of said one end panel being substantially greater than the spacing between said aligned slits, and the spacing between said male members at the inner boundary theerof being substantially equal to the spacing between said aligned slits.

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