

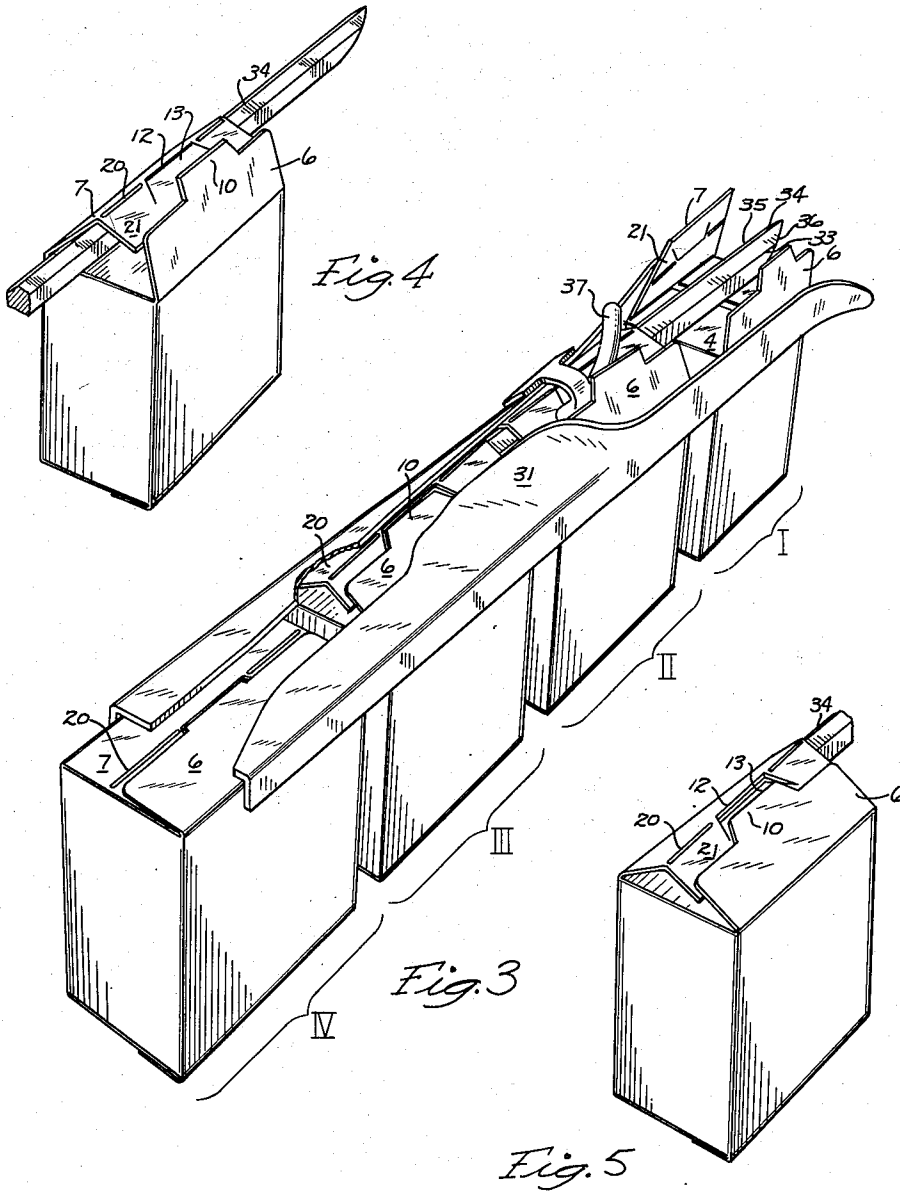
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INTERFITTING LOCK

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INTERFITTING LOCK

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This invention relates to an improved interfitting lock of the type having a tongue portion and a slit portion for receiving the tongue and more particularly to an interfitting lock adapted to be engaged automatically on packaging machines.

Paperboard cartons are presently in use for packaging which have a pair of closure flaps which are adapted to be interlocked by means of a locking tongue on one of the flaps and a tongue receiving slit on the other. Means have been provided on packaging machines whereby cartons of this general type are closed automatically by movement of the carton through the machine and the locking flaps are brought into engagement and locked together. In general these devices include means for flexing the flap carrying the slit portion of the lock so as to open the slit, and other means for inserting the tongue into the open slit. The nexed portions are then released to complete the locking of the flap. I have found that in certain types of mechanical devices for accomplishing this result it is extremely important that the slitted flap of the carton is flexed or folded in a predetermined area or along a predetermined line in order to obtain the proper registration of the slit and the tongue to effect locking.

It is an object of this invention to provide a carton having such an interfitting lock which will have proper register between the tongue flap and the slit flap because of the improved construction of the slit flap. Other objects and advantages of my invention will be apparent from the following description.

Reference is made to the drawings forming a part hereof wherein like numerals are used to refer to similar parts in each of the figures and wherein:

Figure 1 is a plan view of a blank for a folding carton having my improved interfitting lock.

Figure 2 is a perspective view of a set-up carton made from the blank of Figure 1 showing the locking flaps in unlocked relation.

Figure 3 is a perspective illustrative view of a carton having my improved interfitting locking flaps at four different positions when passing through a preferred mechanism for automatically locking said flaps.

Figure 4 is a perspective view showing the relationship of the flaps of the top of my carton in the position in Figure 3 indicated as II.

Figure 5 is similar to Figure 4 only the carton is in the position in Figure 3 indicated as III.

Figure 6 is a partial mid-sectional view illustrating the action of my improved interfitting lock when at position III in passing through the locking mechanism of Figure 3.

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Figure 7 is a view similar to Figure 2 showing another modification of my carton.

A carton blank embodying my invention is shown in Figure 1, wherein by suitable cut and score lines there are provided front panel 2, rear panel 3 and side panels 4. To the side panels are connected closure flaps 5 and to the front and rear panels are connected the locking flaps 6 and 7 along hinge lines 8 and 9 respectively. Locking flap 6 is provided with a tongue 10, and locking flap 7 is provided with a depressable portion 11 defined by a slit 12 which is adapted to receive the tongue 10. The depressable portion 11 is preferably a tab or tongue 13 of the same configuration as the tongue 10 formed by a central cut 14 which is parallel to the connecting hinge 9 and two shorter cuts 15 of equal length intersecting the ends of the central cut 14. Tab 13 is so dimensioned as to permit tongue 10 to enter the slit 12. A glue panel 16 is secured to the front panel 2 and when the carton is set up as shown in Figure 2 the glue panel overlies and is glued to the adjacent side panel in the conventional manner.

A novel feature of my lock construction is the provision of score lines 20 in locking flap 7 which are in alinement with the central cut 14 of the slit 12. These score lines form a hinge along which the locking flap 7 can be folded or will fold under suitable pressure. It is an important feature of my improved carton and carton lock for reasons which will hereafter become apparent that the hinge in the locking flap 7 formed by the cut 14 and the score lines 20 so divides the entire flap 7, that depressable tab 13, and slit 12, are contained in an outer panel 21 formed by such division.

The function of my improved lock will be best illustrated by reference to Figure 3 wherein is shown a preferred type of mechanism for interfitting the tongue flap 6 with the slit locking flap 7 of my carton merely by moving the cartons through the mechanism. In Figure 3 I have shown my carton at four different stages within the locking mechanism designated as I, II, III, and IV to illustrate the various stages of the locking operation. Cartons may be moved through these stages by any suitable conveyor (not shown).

The locking mechanism comprises a pair of plows 30 and 31 preferably formed of metal which are shaped to perform the functions hereinafter described. These plows are generally mounted in fixed spaced relation by supports (not shown). Between these plows is a spear 33 the top surface of which is a single edge 34 formed by the

intersection of two sloping surfaces 35 and 36. A guide rod 37 secured to plow 30 is arranged in a cooperating relationship with this spear.

In the operation of this mechanism a carton entering between the plows as at I will have locking flaps 6 and 7 extending upward. The closure flaps 5 will have been moved into closed position by other equipment or by hand. The locking flaps are engaged by the plows and because of their shape the flaps are folded inwardly along their hinged connections to the carton body as the carton moves from position I to position II. In position II (see Figure 4) the locking flap 7 is folded over the spear 33. The spear is so arranged and positioned that the score lines 20 are in register with the top edge 34 of the spear. The outer panel 21 of the locking flap 7 has been folded to its position by engagement with guide rod 37 which is shaped for this purpose. Because of the score lines 20 this fold will always take place along this predetermined line and hence the depressable tab 13 and slit 12 forming part of the hinge will be wholly in panel 21.

While this operation is taking place with respect to locking flap 7, locking flap 6 is folded inwardly by plow 31 along its connecting hinge 8. At position II flap 6 has been moved only a short distance. In passing from position II to position III the flap 6 passes guide rod 37 and then plow 31 causes it to be folded over and on top of outer panel 21 as shown in position III. (See Figure 5.) Because of the location of the scores in the locking panel the locking tongue 10 of locking flap 6 will overlie depressible tab 13. When this occurs a portion of the spear is removed and the locking tongue 10 by the action of the plow 31 depresses the tab and then enters into the opening formed by the slit 12. This is best illustrated in Figure 6. Continued movement of the carton from position III to position IV results in the plows flattening out both of the flaps with the tongue 10 inserted in the slit 12.

It is an important feature of the locking operation carried out by my preferred mechanism that the locking flap 6 is not folded or flexed except about its connecting hinge 8 at any time during the operation. This greatly improved the rigidity of the finished lock since flexing of paperboard tends to weaken it, and were both flaps folded or flexed the finished lock would not be as satisfactory.

Reference to Figure 6 will illustrate the importance of having the locking flap 7 folded along a predetermined line which is selected to permit the entire depressable portion 11 or tab 13 to be contained in the upper or outer panel 21 formed by the fold. It will also illustrate the importance of having the free end of tab 13 opposite to the free end of flap 7. In Figure 6 the locking panel of my carton is folded along the hinge formed by my scores 20 as in position III. The tab 13 having a length a may swing in the same general arc as tongue 10 and hence may be depressed inwardly leaving an opening of length b , i. e., the distance from the bottom of tab 13 to slit 12 for the locking tongue to enter. Were the locking panel of this carton to fold, when passing through the locking mechanism, along some line such as line X—X of Figure 2, the depressible tab 13 and slit 12 would not lie wholly in the outer panel 21. Consequently when the panel folds, the distance b becomes less than the length a of the tab and the tab 13 cannot be depressed by the locking tongue.

Though in the embodiment described the fold or hinge is in alignment with the central portion 14 of the slit 12, in Figure 7, I have shown an embodiment similar in all respects except that score lines 20' are between the slit 12' and the flap hinge 9'. The depressable portion 11' is still wholly in the outer panel 21' and, therefore, the difficulty described above is avoided.

It is still necessary that the lock be properly dimensioned for any chosen location of the hinge line in any embodiment in order to insure proper register and engagement of the parts. The advantage of my carton is that for any particular design, registration is assured, whereas, in prior cartons variations in paper board structure cause the fold to take place along different lines in different cartons irrespective of the accuracy of the locking mechanism, hence the flaps become out of register.

It is appreciated that other modifications and embodiments of my invention will occur to those skilled in the art and no limitations are intended by the above description of a preferred embodiment other than are contained in the following claims.

I claim:

1. In a paperboard carton an interfitting lock comprising at least two interfitting flaps hinged to said carton and lying entirely in a substantially common plane when locked, one of said flaps presenting an integral tongue and the other having a slit therein for receiving said tongue, said slit being shaped to provide a tab in said flap having its free end opposite to the free end of the flap, and a hinge in said slitted flap extending transversely thereof between the tab formed by said slit and the connecting hinge for said flap.

2. In a paperboard carton an interfitting lock comprising at least two interfitting flaps hinged to said carton and lying entirely in a substantially common plane when locked, one of said flaps presenting an integral tongue and the other having a slit therein for receiving said tongue, said slit being so shaped as to provide a three sided tab in said other flap having its free end opposite to the free end of the said other flap, and a hinge in said slitted flap transversely thereof including score lines aligned with a portion of said slit to locate said three sided tab entirely within the outer panel of said other flap formed by said hinge.

3. In a paperboard carton an interfitting lock comprising at least two interfitting flaps hinged to said carton and lying entirely in a substantially common plane when locked, one of said flaps presenting an integral tongue and the other having a slit therein for receiving said tongue, said slit being shaped to provide a tab in said flap having its free end opposite to the free end of the flap, and a hinge in said slitted flap extending transversely thereof between said slit and the connecting hinge for said flap.

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