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(54) **Folding carton with thread and punch lock.**

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Description

The present invention relates generally to the packaging field and, more particularly, to a folding container, tray or carton having a thread and punch lock on an end panel locking structure that insures full and reliable locking engagement during each carton erecting cycle.

Cartons, trays and other folding containers having end panel locking structures are known in the art. Particularly the end walls of the carton are formed by overlapping end wall panels articulated to the side and bottom walls of the carton body and locked together with tongues, tabs and slits or the like. Boxes and cartons of this type are used to package a wide range of goods from, for example, cookies to automobile parts.

U.S. patent 1,425,256 to Hickman et al discloses according to the preamble of claim 1 a folding berry container including a bottom panel and a pair of oppositely disposed side panels articulated to the bottom panel, an interior end panel articulated to the bottom panel for providing additional strength to the container and also isolating the container interior from outside elements, and first and second locking end panels including a cooperating lock assembly and lock assembly receipt aperture, and articulated to the side panels and overlapping each other and overlying the interior end panel when erected.

While the Hickman concept provides a strong and secure carton, it is not without its disadvantages. The Hickman carton is not designed for erection on the high speed carton forming and erecting machinery required to be economically competitive in the marketplace of today. Specifically, the solid interior end panel can sometimes provide a hinderance to secure engagement of the lock assembly and lock assembly receipt aperture. It has been found that the solid interior end panel resists proper overtravel of the lock assembly as it is punched into position by the punch-in finger of erecting machinery. Without complete engagement of the lock assembly in the cooperating receipt aperture being assured, consistent carton erection cannot be obtained.

U.S. patent 3,206,098 to Stenger et al provides a portion of the locking structure of the overlapping end panels extending above the upper limit of the solid interior end panel. This structure allows some relief and flexibility to aid in lock engagement.

The Stenger carton, however, suffers from several disadvantages. The lock structure is complicated and often interferes with product loading and/or smooth operation of the hinged carton top. The upper edge portion of the lock presents a jagged edge that can hang on the product as it is being inserted, or catch the lower edge of the

charlotte flaps on the top as the carton is being closed. Further, since the interior end panel does not extend along the entire depth, it does not provide the desired degree of isolation of the carton contents from outside elements as, for example, when packaging semi-exposed food products, such as butter patties.

A need is, therefore, identified for a carton with an improved thread and punch lock on the overlapping end panels.

Accordingly, it is a primary object of the present invention to provide a folding container, tray or carton having an improved locking structure overcoming the above-described limitations and disadvantages of the prior art.

Another object of the present invention is to provide a container with a locking structure of added strength and reliability that also assures isolation of the carton contents from outside elements.

Still another object of the present invention is to provide a container with a locking structure that substantially eliminates interference with product loading and top closure.

A further object of the present invention is to provide a container with an end panel locking structure that is easier to erect and that ensures full engagement of the lock during each carton erecting cycle.

Additional objects, advantages, and other novel features of the invention will be set forth in part in the description that follows and in part will become apparent to those skilled in the art upon examination of the following or may be learned with the practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

To achieve the foregoing and other objects and in accordance with the purposes of the present invention as described herein, an improved folding container, tray or carton formed from a single sheet of foldable material is provided. The folding container includes a bottom panel and a pair of oppositely disposed side panels articulated to the bottom panel, an interior end panel articulated to the bottom panel for providing additional strength to the container and also isolating the container interior from outside elements, and first and second locking end panels including a cooperating lock assembly and lock assembly receipt aperture and articulated to the side panels and overlapping each other and overlying the interior end panel when erected, characterized by:

a relief slit formed in the interior end panel to allow full engagement between the lock assembly and receipt aperture of the first and second locking end panels during carton erection, the relief slit being spaced from an adjacent edge of the lock assem-

bly receipt aperture to ensure that the container interior remains isolated from outside elements along the entire lock when in the locked position.

Preferably, the first locking end panel includes the lock assembly, which preferably includes a tongue and cooperating locking tab. The second locking end panel preferably includes the lock assembly receipt aperture. When the tongue and tab are inserted and punched into the receipt aperture of the second locking end panel, secure locking action is provided through desirable four-point engagement.

Preferably, the relief slit along the interior end panel is substantially U-shaped. The open end of the U is directed toward the lock assembly receipt aperture when the end panels are in overlapping or erected position. In this position, the slit extends along the interior end panel adjacent the edge of the receipt aperture. Thus, the interior end panel provides the desired relief as the mechanical punch-in finger secures the lock structure, and at the same time provides the desired protection of the carton contents from outside elements along the entire lock.

In accordance with the invention, a thread and punch lock on cooperating panels of a folding container having an interior panel providing additional strength to the container and isolating the container interior from outside elements, the cooperating panels overlapping each other and overlying the interior panel when erected, is characterised by:

a relief slit formed in the interior panel to allow full engagement of the thread and punch lock of the cooperating panels during container erection, the relief slit being spaced from the thread and punch lock to ensure that the container interior remains isolated from outside elements along the entire lock when in the locked position.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a top plan view of a paperboard blank for folding into a tray including a thread and punch lock of the present invention;

Figures 2 - 5 and related figures are end elevational, cross sectional and top views showing the step-by-step erection of a tray including a thread and punch lock and interior end panel with relief means constructed in accordance with the teachings of the present invention;

Figure 6 is an end elevational view of the tray with the lock fully engaged.

Reference is now made to Figure 1 showing a tray blank 10 including the end panel thread and punch lock constructed in accordance with the principles of the present invention. The blank 10 is preferably formed from a single sheet of coated

paperboard. The blank 10 has a generally elongated, rectangular shape and is formed having a bottom panel 12, a pair of side panels 14, 16 articulated to opposite sides of the bottom panel 12 at side panel fold lines 18, 20 respectively. An interior end panel 22 is articulated to each end of the bottom wall panel 12 along an end panel fold line 24. A first locking end panel 26 is articulated to each end of the side panel 14 along fold line 28 while a second locking end panel 30 is articulated to each end of the sidewall panel 16 along the fold line 32. The blank 10 is erected into a tray by folding the side panels 14, 16 and end panels 22, 26 and 30 in overlapping relation as shown in the drawing figures and described in detail below.

The first locking end panels 26 each include a lock assembly comprising a tongue 34 along the outer edge 36 and a cooperating locking tab 38 longitudinally spaced from the tongue along a mid-portion of the panel. The tongue 34 and cooperating locking tab 38 of the first locking end panel 26 are received in an aperture 40 in the second locking end panel 30 to securely lock the end panels of the tray or carton in the erected position. With both the tongue 34 and cooperating locking tab 38 received in the aperture 40, secure engagement is provided at at least four points 42 (note Figure 5).

The interior end panels 22 each include a relief slit 44 of substantially U-shape and substantially in alignment with the locking tab 38. When folded into proper overlapping relation during tray or carton erection, the open end of the substantially U-shaped relief slit 44 is also directed toward and substantially surrounds one side of the receipt aperture 40 in the second locking end panel 30 (note Figure 3). In fact, the relief slit 44 is spaced from, but adjacent one edge 46 of the receipt aperture 40. Thus, it should be appreciated that the interior end panel 22 with relief slit 44 provides firm backup to the edge 46 of the lock assembly receipt aperture 40, but at the same time allows inward travel of a punch-in finger (see Figure 5A). This action allows reliable, full engagement of the locking tab 38 with the aperture edge 46. Further, the interior panel 22 provides additional strength to the carton and support to the locking panels 26, 30. Since there is no opening in the panel 22 but only a slit 44, the desirable isolation of the interior of the erected tray or carton is obtained.

As shown in Figures 2 and 2B, the initial erecting and thread and punch lock engaging step comprises the upward folding (note action arrow A) of the interior end panel 22 along the fold line 24. Next, the sidewall panel 16 is upwardly folded about the fold line 20 and the second locking end panel 30 is folded inwardly, as shown in Figures 3, 3A and 3B (see action arrow B).

The opposite sidewall panel 14 is now folded

upwardly along the fold line 18 to a position parallel to the now folded sidewall panel 16. The first locking end panel 26 is then folded inwardly (note action arrow C and Figures 4, 4A and 4B) to overlie the second locking end panel 30. The tongue 34 is inserted or threaded through the lock receipt aperture 40 (note Fig. 4B).

The final lock securing step is shown in Figures 5, 5A and 6. The backup piece P of the automated high speed erecting machinery is inserted into the carton to engage one side of the interior end panel 22. The tab punch-in finger F is then moved in the direction of action arrow D to engage the locking tab 38 and snap the tab 38 past the edge 46 of the aperture 40. This locking action fully and completely provides the overlapping end panels 26, 30 with secure engagement at the four points 42 (see Fig. 6). Advantageously, the relief slit 44 in the interior end panel 22 allows the proper inward movement to the paperboard to assure full engagement of the locking tab 38.

In summary, numerous benefits have been described which result from employing the concepts of the present invention. In particular, the full depth interior end panel 22 provides added strength to the carton and assures isolation of the carton contents from outside elements all along the lock. Additionally, the relief slit 44 in the end panel 22 simplifies the carton or tray erection process, and assures full and reliable engagement of the thread and punch lock during each carton erecting cycle.

The foregoing description of the preferred embodiment of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiment was chosen and described to provide the best illustration of the principles of the invention and its practical application to thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

Claims

1. A folding container (10) including a bottom panel (12) and a pair of oppositely disposed side panels (14, 16) articulated to the bottom panel, an interior end panel (22) articulated to the bottom panel for providing additional

strength to the container and also isolating the container interior from outside elements, and first and second locking end panels (26, 30) including a cooperating lock assembly (34, 38) and lock assembly receipt aperture (40), and articulated to the side panels and overlapping each other and overlying the interior end panel when erected, characterized by:

a relief slit (44) formed in the interior end panel (22) to allow full engagement between the lock assembly (34, 38) and receipt aperture (40) of the first and second locking end panels (26, 30) during carton erection, the relief slit (44) being spaced from an adjacent edge (46) of the lock assembly receipt aperture (40), to ensure that the container interior remains isolated from outside elements along the entire lock when in the locked position.

2. A folding container as in Claim 1, characterized in that the first locking end panel (26) includes the lock assembly (34, 38).
3. A folding container as in Claim 1 or Claim 2, characterized in that the lock assembly includes a tongue (34) and cooperating locking tab (38).
4. A folding container as in Claim 3, characterized in that the second locking end panel (30) includes the lock assembly receipt aperture (40).
5. A folding container as in any one of Claims 1 to 4, characterized in that the relief slit (44) is substantially U-shaped.
6. A folding container as in any one of Claims 1 to 5, characterized in that the lock assembly receipt aperture (40) retains the lock assembly (34, 38) with four point engagement when the first and second locking end panels (26, 30) are in an overlapping relation overlying the interior end panel (22).
7. A folding container as in Claim 5, characterized in that the U-shaped relief slit (44) is directed with an open end toward the lock assembly receipt aperture (40).
8. A folding container as in Claim 3, characterized in that the relief slit (44) when locked extends across the interior end panel (22) adjacent a tab engaging edge (46) of the lock assembly receipt aperture (40).
9. A thread and punch lock (34, 38, 40) on cooperating panels (26, 30) of a folding container (10) having an interior panel (22) providing

additional strength to the container and isolating the container interior from outside elements, the cooperating panels overlapping each other and overlying the interior panel when erected, characterized by:

a relief slit (44) formed in the interior panel (22) to allow full engagement of the thread and punch lock (34, 38, 40) of the cooperating panels (26, 30) during container erection, the relief slit (44) being spaced from the thread and punch lock (34, 38, 40), to ensure that the container interior remains isolated from outside elements along the entire lock when in the locked position.

Revendications

1. Un conteneur pliant (10) comprenant un panneau de base (12) et deux panneaux latéraux disposés de part et d'autre (14, 16) s'articulant sur le panneau de base, un panneau d'extrémité intérieur (22) s'articulant sur le panneau de base pour donner une résistance supplémentaire au conteneur et aussi pour isoler le conteneur intérieur des éléments extérieurs, et un premier et un second panneaux d'extrémité pour le verrouillage (26, 30) comprenant des moyens pour le verrouillage (34, 38) coopérant avec une ouverture (40) pour recevoir l'ensemble de verrouillage (40), s'articulant sur les panneaux latéraux qui se recouvrent partiellement et qui recouvrent le panneau d'extrémité intérieur quand celui-ci est redressé, caractérisé par:
une fente supplémentaire (44) formée à l'intérieur du panneau d'extrémité (22) permettant aux moyens de verrouillage (34, 38) de s'engager entièrement dans l'ouverture de réception (40) du premier et du second panneaux d'extrémité (26, 30) quand on redresse le carton, la fente supplémentaire (44) étant éloignée du bord contigu (46) de l'ouverture de réception (40) du dispositif de verrouillage, afin de s'assurer que le conteneur intérieur reste isolé des éléments extérieurs pendant le maintien dans la position fermée.
2. Un conteneur pliant selon la revendication 1, caractérisé en ce que le premier panneau d'extrémité de verrouillage (26) comprend les moyens de verrouillage (34, 38).
3. Un conteneur pliant selon Revendication 1 ou Revendication 2, caractérisé en ce que les moyens de verrouillage comprennent une languette (34) et une patte de verrouillage complémentaire (38).
4. Un conteneur pliant selon Revendication 3, caractérisé en ce que l'ouverture (40) recevant les moyens de verrouillage est intégrée dans le deuxième panneau d'extrémité de verrouillage (30).
5. Un conteneur pliant selon l'une des Revendications 1 à 4, caractérisé en ce que la fente supplémentaire (44) est en forme de U.
6. Un conteneur pliant selon l'une des revendications 1 à 5, caractérisé en ce que l'ouverture (40) qui reçoit le dispositif de verrouillage (40) retient les moyens de verrouillage (34, 38) avec un engagement en quatre points quand le premier et le deuxième panneau d'extrémité de verrouillage (26, 30) se recouvrent partiellement et recouvrent le panneau d'extrémité intérieur.
7. Un conteneur pliant selon la Revendication 5, caractérisé en ce que l'extrémité ouverte de la fente supplémentaire en forme de U (44) est orientée vers l'ouverture de réception (40) des moyens de verrouillage.
8. Un conteneur pliant selon la Revendication 3, caractérisé en ce que la fente supplémentaire (44) quand elle est verrouillée est disposée dans le panneau d'extrémité intérieur (22) en étant adjacente au bord (46) pour l'introduction dans l'ouverture (40) de la patte de verrouillage (40).
9. Un dispositif de verrouillage par enfoncement (34, 38, 40) sur les panneaux (26, 30) d'un conteneur pliant (10) qui comporte un panneau intérieur (22) donnant une résistance supplémentaire au conteneur et isolant le conteneur intérieur des éléments extérieurs, les panneaux faisant partie du dispositif se recouvrant partiellement et recouvrant le panneau intérieur quand il est redressé, caractérisé par:
une fente supplémentaire (44) formée dans le panneau intérieur (22) pour permettre au dispositif de verrouillage par enfoncement (34, 38, 40) de s'engager entièrement à l'intérieur des panneaux latéraux (26, 30) avec lesquels il coopère pendant le montage du conteneur, la fente supplémentaire (44) étant disposée par rapport au dispositif de verrouillage par enfoncement (34, 38, 40), de manière à permettre au conteneur intérieur de rester isolé des éléments extérieurs pendant tout le temps où le dispositif de verrouillage est en position verrouillée.

Ansprüche

1. Faltbehälter (10) mit einem Bodenfeld (12) und einem Paar gegenüberliegend angeordneter, an das Bodenfeld angelenkter Seitenfelder (14, 16), einem inneren, an das Bodenfeld angelenkten Endfeld (22), welches dem Behälter zusätzliche Festigkeit verleiht und auch das Behälterinnere von äußeren Elementen abschirmt, und mit ersten sowie zweiten verriegelnden Endfeldern (26, 30), die eine miteinander wechselwirkende Riegelanordnung (34, 38) sowie Riegelanordnungsaufnahmeöffnung (40) aufweisen und an die Seitenfelder angelenkt sind sowie einander überlappen und das innere Endfeld im aufgerichteten Zustand überlagern, gekennzeichnet durch:
einen Hilfsschlitz (44), der im inneren Endfeld (22) ausgebildet ist, um einen vollständigen Eingriff zwischen der Riegelanordnung (34, 38) und Aufnahmeöffnung (40) der ersten und zweiten verriegelnden Endflächen (26, 30) beim Kartonaufrichten zu ermöglichen, und mit Abstand von einer benachbarten Kante (46) der Riegelanordnungsaufnahmeöffnung (40) angeordnet ist, um sicherzustellen, daß das Behälterinnere in der verriegelten Stellung längs der gesamten Verriegelung von äußeren Elementen abgeschirmt bleibt. 5 10 15 20 25 30
2. Faltbehälter nach Anspruch 1, dadurch gekennzeichnet, daß das erste verriegelnde Endfeld (26) die Riegelanordnung (34, 38) aufweist. 35
3. Faltbehälter nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Riegelanordnung eine Zunge (34) und eine damit zusammenwirkende Verriegelungslasche (38) aufweist. 40
4. Faltbehälter nach Anspruch 3, dadurch gekennzeichnet, daß das zweite verriegelnde Endfeld (30) die Riegelanordnungsaufnahmeöffnung (40) aufweist. 45
5. Faltbehälter nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der Hilfsschlitz (44) im wesentlichen U-förmig ausgebildet ist. 50
6. Faltbehälter nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Riegelanordnungsaufnahmeöffnung (40) die Riegelanordnung (34, 38) mit einem Vierpunkteingriff hält, wenn die ersten und zweiten verriegelnden Endfelder (26, 30) in einer überlappenden, das innere Endfeld (22) überlagernden Anordnung zueinander stehen. 55
7. Faltbehälter nach Anspruch 5, dadurch gekennzeichnet, daß der U-förmige Hilfsschlitz (44) mit einem offenen Ende zur Riegelanordnungsaufnahmeöffnung (40) hin gerichtet ist. 60
8. Faltbehälter nach Anspruch 3, dadurch gekennzeichnet, daß sich der Hilfsschlitz (44) im verriegelten Zustand einer Lascheneingriffskante (46) der Riegelanordnungsaufnahmeöffnung (40) benachbart über das innere Endfeld (22) erstreckt. 65
9. Steck- und Eindrückverriegelung (34, 38, 40) an miteinander wechselwirkenden Feldern (26, 30) eines Faltbehälters (10) mit einem inneren Feld (22), welches dem Behälter zusätzliche Festigkeit verleiht und das Behälterinnere von äußeren Elementen abschirmt, wobei die miteinander wechselwirkenden Felder einander überlappen und im aufgerichteten Zustand das innere Feld überlagern, gekennzeichnet durch:
einen Hilfsschlitz (44), der im inneren Feld (22) ausgebildet ist, um einen vollständigen Eingriff der Steck- und Eindrückverriegelung (34, 38, 40) der miteinander wechselwirkenden Felder (26, 30) beim Behälteraufrichten zu ermöglichen, und der entfernt von der Steck- und Eindrückverriegelung (34, 38, 40) angeordnet ist, um sicherzustellen, daß das Behälterinnere in der verriegelten Stellung längs der gesamten Verriegelung von äußeren Elementen abgeschirmt bleibt. 70 75 80 85 90 95

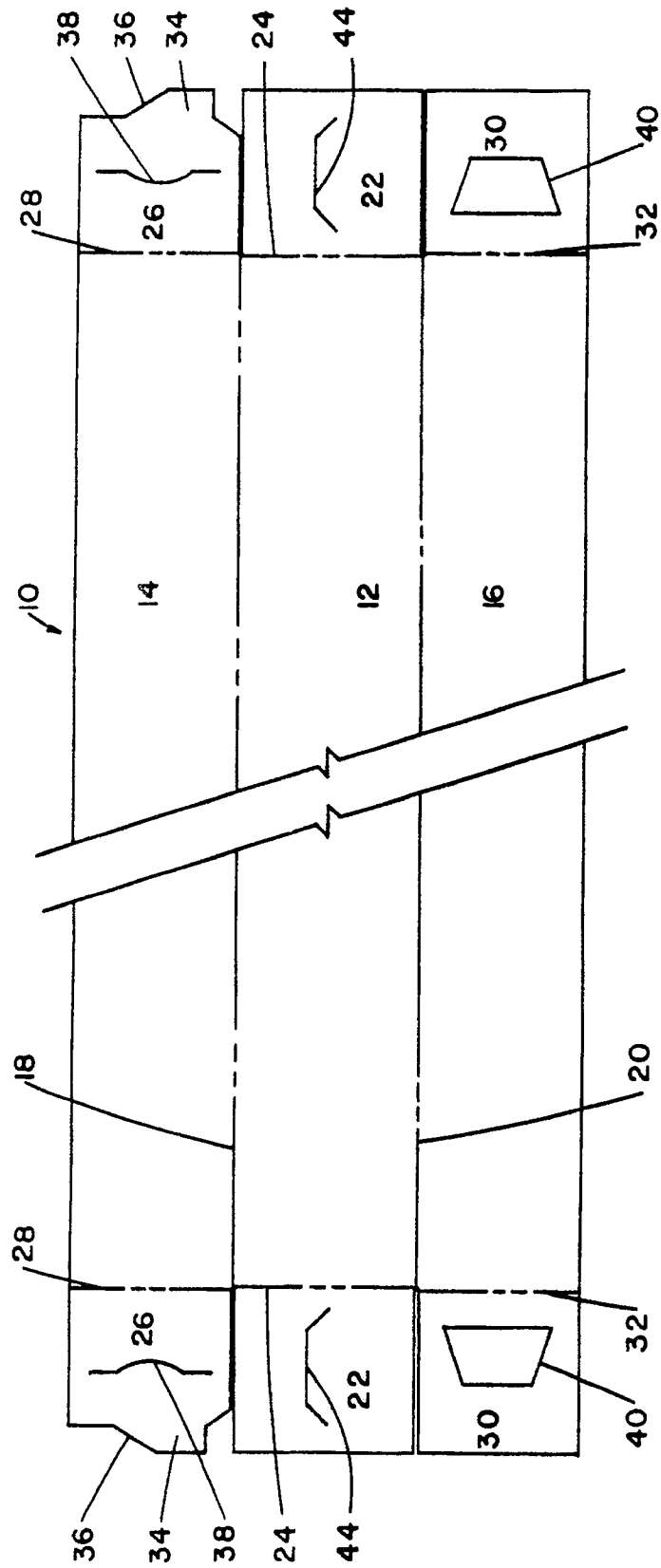


FIG. 1

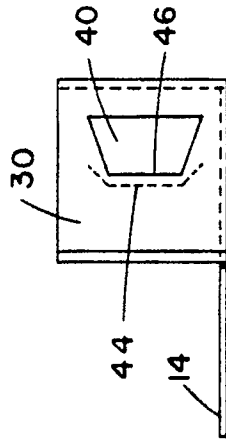


FIG. 2

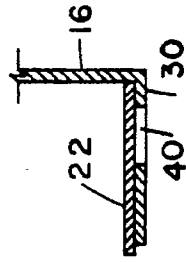


FIG. 3A

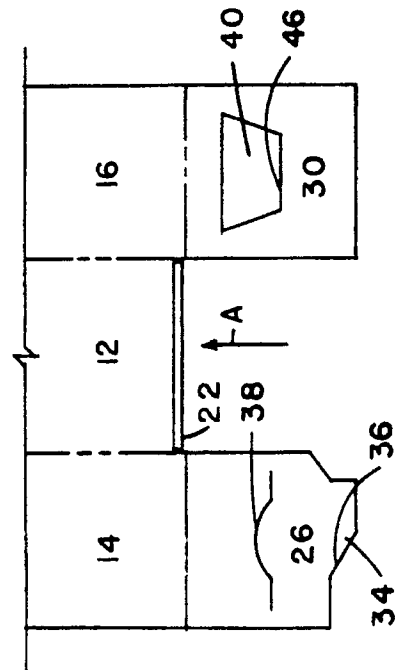


FIG. 2B

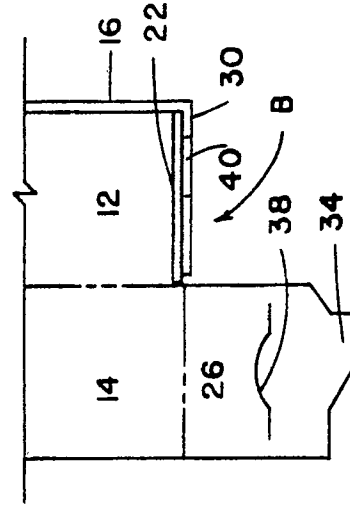


FIG. 3B

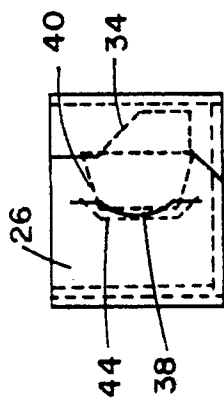


FIG. 4

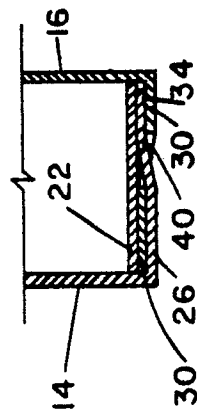


FIG. 4A

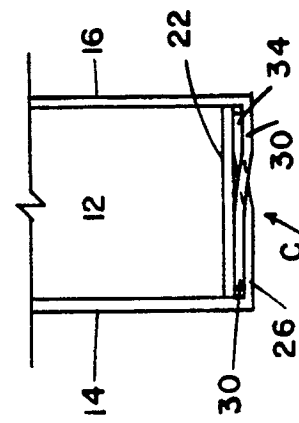


FIG. 4B

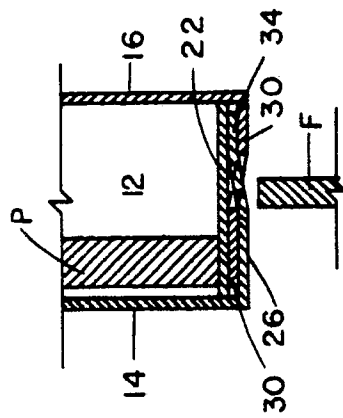


FIG. 5

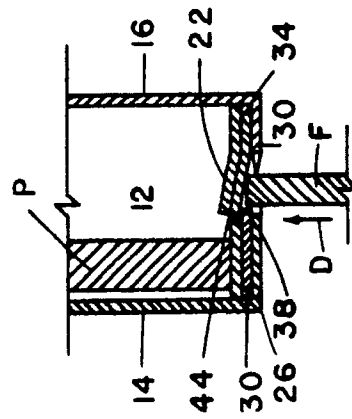


FIG. 5A

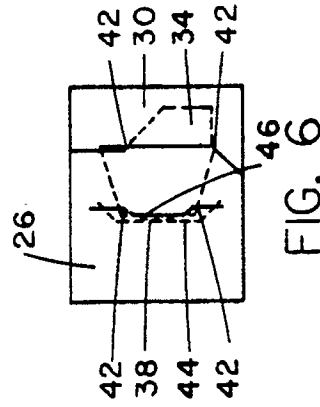


FIG. 6