April 28, 1970 E. J. GRASER 3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Filed March 26, 1968 5 Sheets-Sheet 1

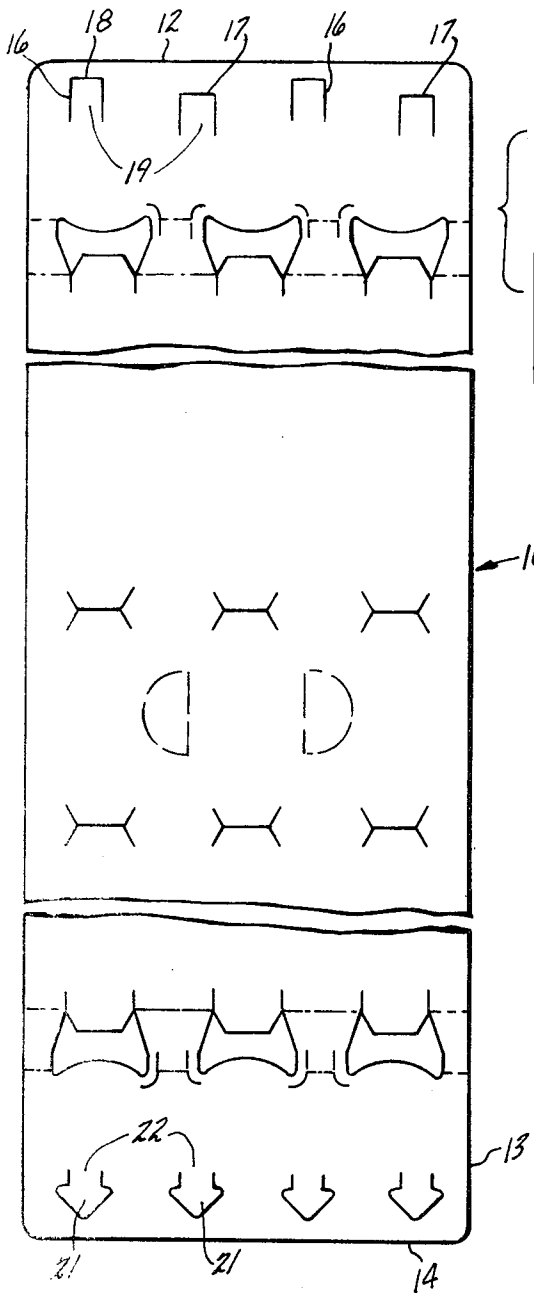


FIG-1

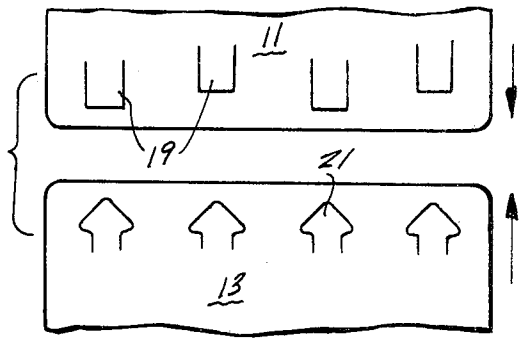


FIG-3

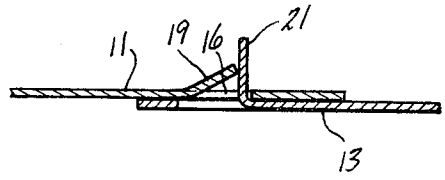


FIG-4

INVENTOR
EARL J. GRASER

BY R. J. Strickler

ATTORNEY

April 28, 1970 E. J. GRASER 3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Filed March 26, 1968 5 Sheets-Sheet 2

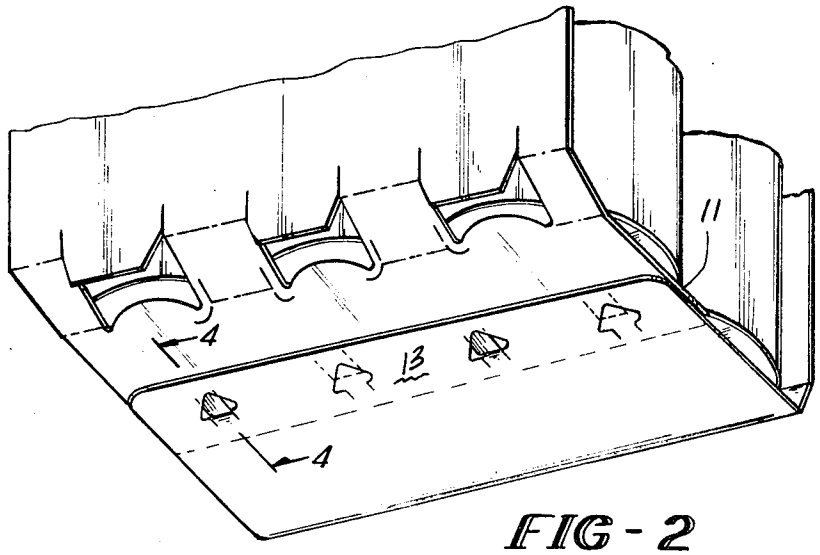


FIG - 2

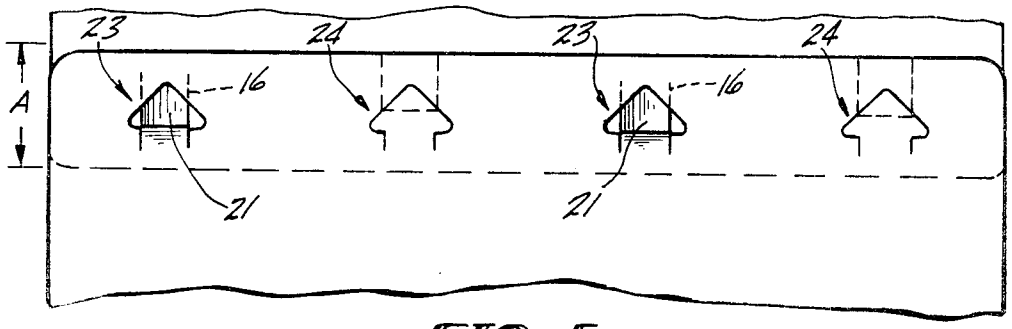


FIG - 5

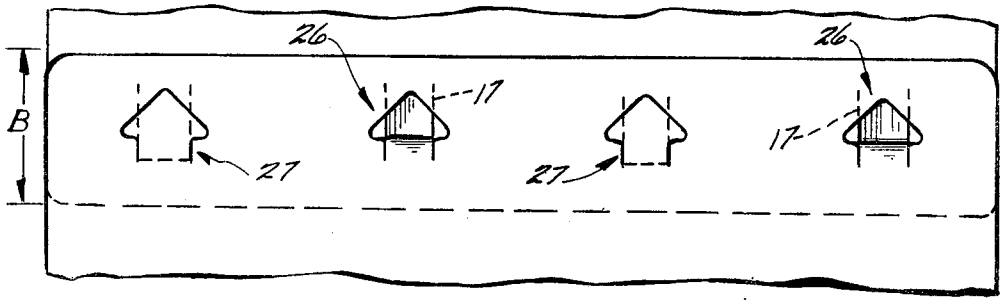


FIG - 6

INVENTOR:
EARL J. GRASER

BY R. J. Stinchcomb

ATTORNEY

April 28, 1970 E. J. GRASER 3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Filed March 26, 1968 5 Sheets-Sheet 3

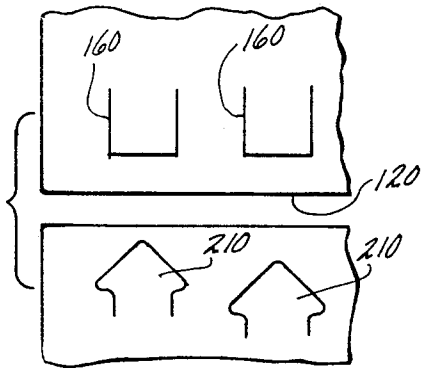


FIG-7A

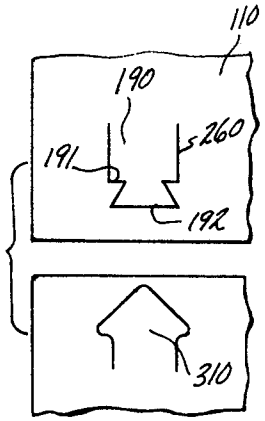


FIG-8A

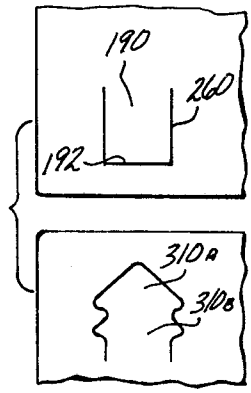


FIG-8D

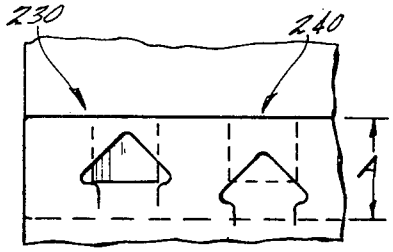


FIG-7B

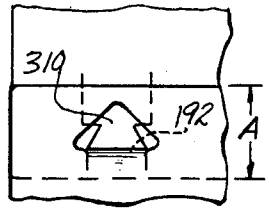


FIG-8B

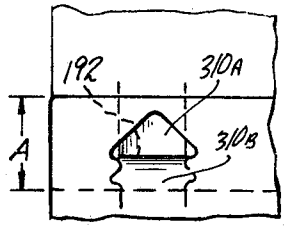


FIG-8E

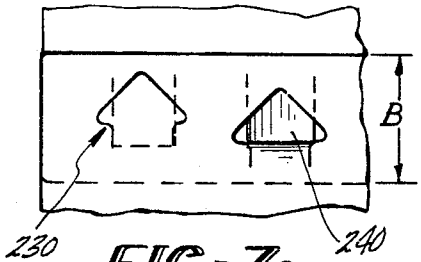


FIG-7C

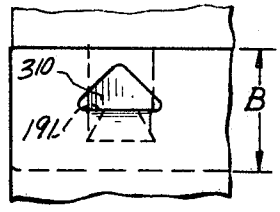


FIG 8C

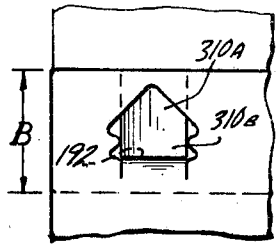


FIG-8F

INVENTOR:
EARL J. GRASER

BY R. J. Struchler

ATTORNEY

April 28, 1970 E. J. GRASER 3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Filed March 26, 1968 5 Sheets-Sheet 4

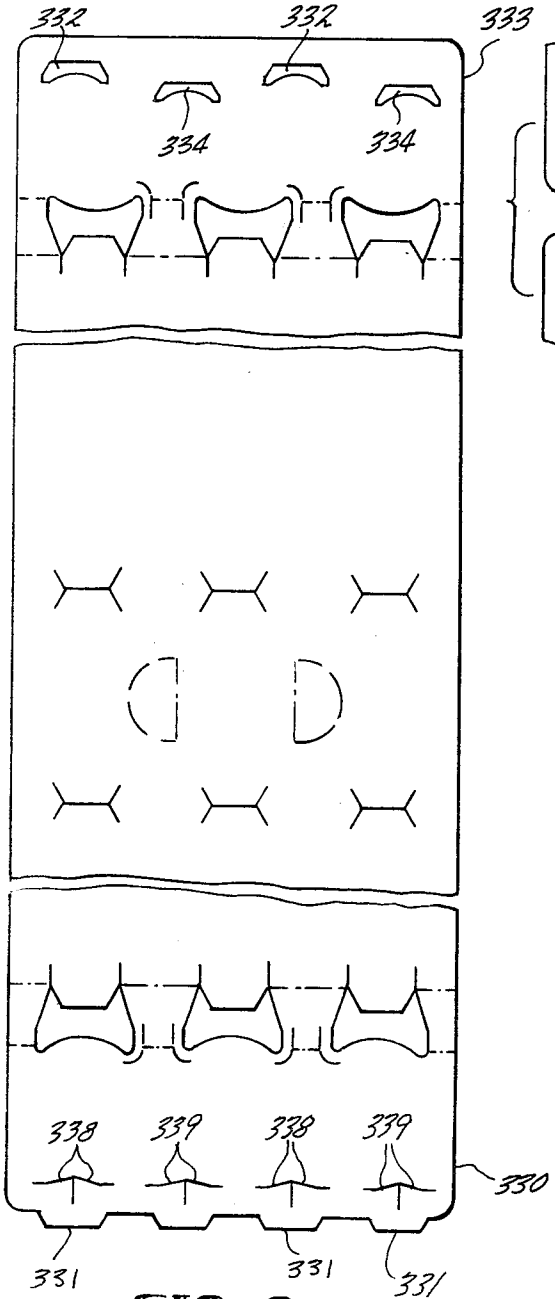


FIG-9

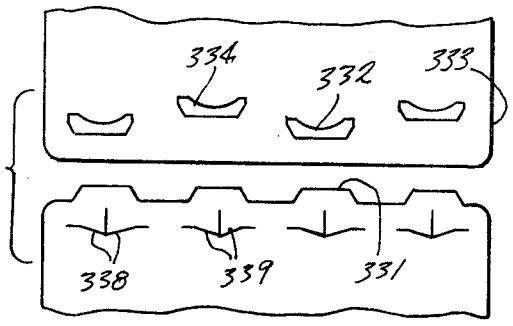


FIG-11

FIG-12

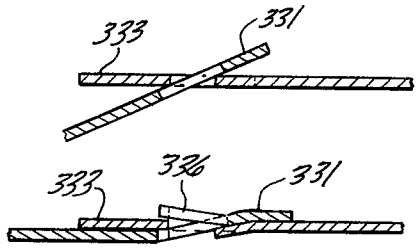


FIG-13

INVENTOR:
EARL J. GRASER

BY

ATTORNEY

April 28, 1970 E. J. GRASER 3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Filed March 26, 1968 5 Sheets-Sheet 5

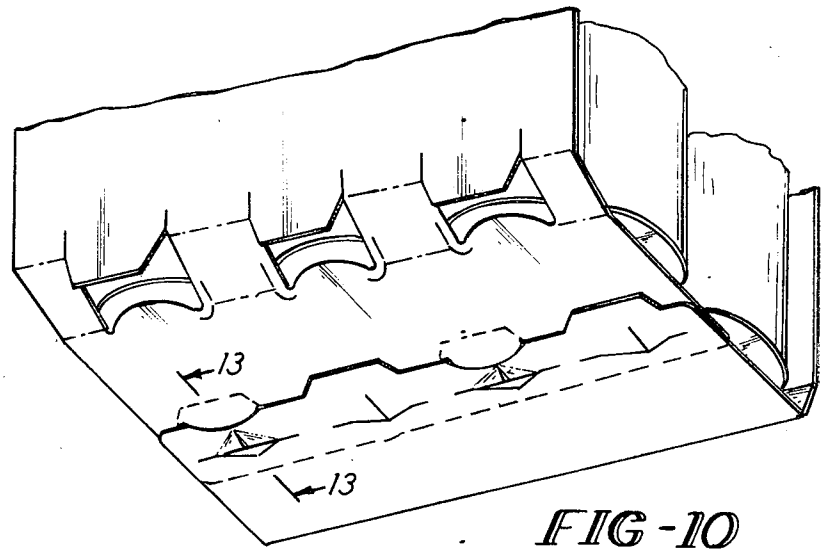


FIG-10

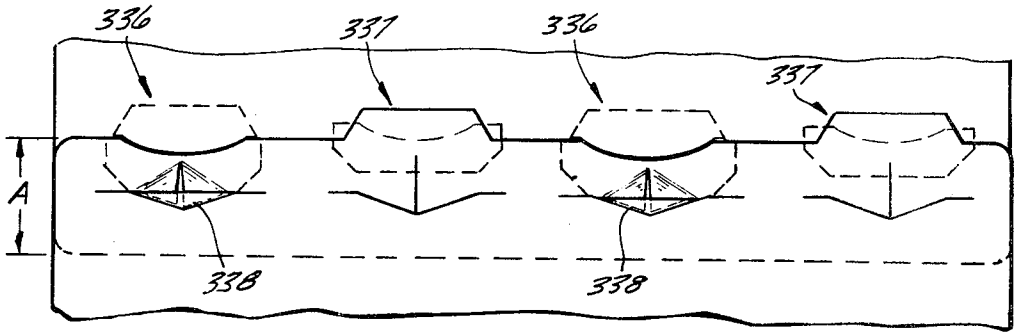


FIG-14

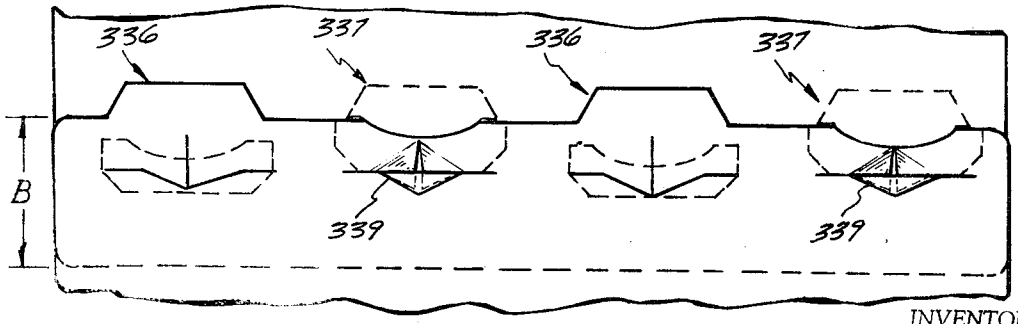


FIG-15

INVENTOR:
EARL J. GRASER

BY R. J. Thurston

ATTORNEY

United States Patent Office 3,508,699
Patented Apr. 28, 1970

3,508,699

AUTOMATICALLY ADJUSTABLE PUNCH LOCK DEVICE

Earl J. Graser, Monroe, La., assignor to Olinkraft, Inc., a corporation of Delaware

Filed Mar. 26, 1968, Ser. No. 716,132
Int. Cl. B65d 5/02, 25/14
U.S. Cl. 229—40 5 Claims

ABSTRACT OF THE DISCLOSURE

An automatically adjustable punch lock device for a wraparound article carrier of the type utilized to contain a plurality of generally similar articles, said articles frequently varying in dimensions within tolerable limits.

A particular feature of the invention is the provision of a wrap-around blank useful to generate a package where the blank is cut and scored to define a so-called "punch lock" device effective to secure overlapping end margins of the blank together to hold the articles snugly in the package.

The language "punch lock" is intended to denote a lock device having at least two basic elements defining an aperture formed in a first overlapping margin and a punch tab formed in a second overlapping margin so that when the tab and the aperture are brought into register the tab is mechanically punched through the aperture to effect a locking action between the overlapping margins.

The present invention contemplates utilization of various punch lock configurations and structures, for exemplary purposes and to provide background, recognizing that one embodiment of the inventive concept resides in structuring or designing the wrap-around blank so that the overlapping margins are formed with a plurality of apertures which are staggered with respect to their distance from the edge of the end margin. Each aperture being provided in its cooperating end margin with a complementary punch tab so that depending upon the perimeter dimension of the blank or the package at the instant the locking function is to be effected, the punch tab which is in register with an aperture is thrust through the aperture to effect the lock.

Abviously, if one chooses, the punch tabs can be staggered relative to the edge of the particular end margin in which the tabs are formed and in this situation the mating overlapping end margin will be formed with apertures which are uniformly aligned relative to their distance from the corresponding edge of the margin.

The particular feature of the invention resulting from the staggering of the apertures (and/or the punch tabs) resides in the ability to generate a lock device in a wrap-around article carrier which is automatically adjustable for reasonable variations in perimeter diameter of the package resulting from over-and undersized condition of otherwise similar articles.

Stated differently, in order to achieve a tight package one must have the ability to adjust the degree of overlap in the overlapping margins and thereafter be in a position to effect a punch lock to retain the tightness.

A wrap-around article carrier blank embracing certain principles of the present invention may comprise a generally elongated blank having a pair of opposed end margins operable to asume an overlap position, one end margin defining an inner margin being formed with at least two apertures, the other end margin defining an outer margin being formed with two punch tabs, said apertures and mating punch tabs being so positioned relative to the end edges of their respective margins that when the margins are overlapped to a first position

corresponding to a first perimeter dimension in a finished carrier, a first lock is effected between one aperture and its mating punch tab and when said margins are overlapped to a second position corresponding to a second perimeter dimension in said finished carrier, said other aperture and its mating punch tab are operative to effect a second different lock to accommodate said different perimeter dimension.

In an alternative embodiment of the invention, it is possible to design a wrap-around blank in which a single aperture and a mating single punch tab are automatically and selectively operable to lock in a first or in a second position to accommodate two different perimeter dimensions in the package without resorting to the use of staggered apertures or staggered punch tabs.

Other features and advantages of the invention will become apparent from an examination of the succeeding specification and claims when read in conjunction with the appended drawings, in which:

FIG. 1 is a representative blank showing an exemplary embodiment of the invention;

FIG. 2 shows a partial package or article carrier with the blank in the operated condition;

FIG. 3 shows the end margins of the blank of FIG. 1 just prior to their moving into the overlapped condition. In this embodiment of the invention, the apertures are staggered;

FIG. 4 shows the lock of FIG. 3 operated and is a representation of a portion of the package of FIG. 2 as viewed along the lines **4—4**;

FIG. 5 is a partial representation of a completed article carrier or package showing two locks corresponding to a first (large) perimeter dimension operated, and two other locks idle;

FIG. 6 is a view similar to FIG. 5 showing two locks corresponding to a second (small) perimeter dimension operated with the remaining locks idle, note that the overlap dimension A of FIG. 5 is smaller than the corresponding margin overlap dimension B of FIG. 6);

FIGS. 7A, 7B and 7C are similar to FIGS. 3, 5 and 6 illustrating blank design when the punch tabs are staggered and the apertures are uniformly aligned;

FIGS. 8A, 8B and 8C are representative of an alternative embodiment of the present invention and are of marked significance in that an automatically adjustable lock is effected by utilizing merely one aperture in one margin and a single punch tab in the other margin to accommodate two different perimeter dimensions in a finished article carrier;

FIGS. 8D, 8E and 8F are similar to FIGS. 8A, 8B and 8C except that the single aperture is plain and the punch tab has two operative positions;

FIG. 9 shows a still further embodiment of the invention wherein a modified punch type lock is disclosed, the difference being that the punch step is preceded by a preliminary or conditioning step;

FIG. 10 shows an article carrier with the blank of FIG. 9 in the operated condition;

FIG. 11 shows the end margins only of the blank of FIG. 9 just prior to moving into overlap position;

FIG. 12 shows the preliminary step in operating the lock of FIG. 9;

FIG. 13 shows the operated lock as viewed in the plane of section line designated **13—13** in FIG. 10; and

FIGS. 14 and 15 show the article carrier of FIG. 10 locked to accommodate two different perimeter dimensions in that FIG. 14 accommodates the longer dimension and FIG. 15 the shorter dimension.

Referring now to the drawings, in particular FIGS. 1 through 7C, note that the blank of FIG. 1, indicated generally by the reference numeral **10**, is formed with opposed end margins defining inner margin **11**, having end

edge **12** and outer margin **13**, having end edge **14**. Margins **11** and **13** are operative to overlap as is apparent in FIGS. 2 and 4. Margin **11** is formed with a plurality of apertures, openings or cut-outs **16—16** staggered or offset relative to corresponding apertures **17—17**.

By the language "staggered" or "offset" is meant that the edge or boundary **18** of opening **16** is a different distance from margin edge **12** relative to the corresponding boundary of opening **17**.

It is to be further understood that the apertures **16** and **17** may be free of board material or may be formed with a hinged chad or tab, such as chad **19**.

The opposed end margin **13** is formed with a plurality of punch tabs **21—21** hinged to the margin **13** as at **22**. In the representation of FIG. 1, the punch tabs **21—21** are all in alignment (in contrast to the staggered position of the apertures **16—16** and **17—17** in margin **11**) in that the punch tabs are equidistant from the end edge **14** of margin **13**.

FIG. 3 shows the margin **11** and margin **13** approaching one another during manipulation of the blank in forming the article carrier of FIG. 2.

FIG. 4 shows an operated lock by way of sectioning a portion of FIG. 2 in that inner margin **11** is overlapped and locked to outer margin **13** wherein punch tab **21** is shown in engagement with and pushed through aperture **16**. Reference numeral **19** denotes a hinged chad.

Incidentally, the representation of FIG. 4 when viewed in combination with FIGS. 2 and 5 will show that the lock device is accommodating a first or small overlap dimension A corresponding to a large perimeter diameter in the article carrier.

Referring now in more detail to FIGS. 5 and 6, the representation of FIG. 5 shows two operated locks indicated by the reference numerals **23—23** and two idle locks represented by the reference numerals **24—24**. Thus, in FIG. 5 apertures **16—16** are accommodating mating punch tabs **21—21**.

In contrast, FIG. 6 shows a wider overlap dimension represented by the letter B wherein a second set of locks identified by the reference numeral **26** are operative.

Naturally, this lock operation corresponds to a different or small perimeter dimension in the completed article carrier in that apertures **17—17** are accommodating mating tabs **21—21** in operative fashion.

Correspondingly, locks **27—27** are idle.

FIGS. 7A, 7B and 7C show another embodiment of the lock device of FIG. 1 where the basic modification is that the punch tabs **210** are staggered and the apertures **160** are uniformly spaced from their adjacent margin edge **120**.

FIG. 7B shows lock **230** operated and lock **240** idle, while FIG. 7C shows lock **230** idle and lock **240** operated. Correspondingly, FIG. 7B denotes a narrow overlap dimension A (large perimeter in package) and FIG. 7C shows a large overlap dimension B (small perimeter in article carrier).

Referring now to FIGS. 8A through 8F, a still further alternative embodiment of the invention is illustrated and particular attention is directed to the fact that in this embodiment of the automatic adjustable lock device of the present invention, structure has been devised in the end margin **110** (FIGS. 8A through 8C) which effects an automatically adjustable punch lock device with but a single aperture **260** and a single punch tab **310**. Here again, there may be a hinged chad, such as chad **190**.

The significant change being that the effect of a staggered pair of apertures is achieved in a single aperture **260** by providing two working surfaces identified by the reference numerals **191** and **192** so that the punch tab **310** may be punched into aperture **260** at two different overlap dimensions (A of FIG. 8B or B of FIG. 8C) depending upon what perimeter dimension is generated in the region of the lock by the completed article carrier.

For example, if the margin overlap dimension develops as in FIG. 8B (large perimeter dimension), punch tab **310** is rotated about work surface **192**. In contrast, if the overlap dimension corresponds to B of FIG. 8C (denoting a small perimeter dimension), the punch tab **310** is jammed so that it rotates about working surface **191**.

Thus, an automatically adjustable punch lock device is possible with a single aperture **260** and a single punch tab **310**.

FIGS. 8D through 8F show a plain aperture **260** (without extra work surface **191**) and the punch tab is formed with a double head **310A** and **310B** operable from two different position—namely, flap **310A** is punched in FIG. 8E (small overlap dimension A) and flap **310B** (including **310A**) is punched in FIG. 8F (large overlap dimension B).

FIG. 9 shows an alternative embodiment of the invention in that end margin **330** is formed with a plurality of insert tabs **331—331** which are received in mating apertures **332** of end margin **333** as shown in FIG. 12 prior to the punch lock operation.

In this embodiment of the invention, apertures **332** are staggered relative to apertures **334** and as is most apparent in FIGS. 14 and 15, locks **336—336** (split punch tabs **338—338** mate with apertures **332—332**) are operative to accommodate a large perimeter dimension (small overlap dimension A) in the carrier, while locks **337—337** (split punch tabs **339—339**) are idle.

Correspondingly, FIG. 15 shows a large overlap dimension B (to accommodate a small perimeter dimension) and locks **337—337** (split punch tabs **339—339** mate with apertures **334—334**) are operated and locks **336—336** are idle.

It is anticipated that a number of embodiments of the present invention will be devised without departing from the spirit and scope thereof.

For purposes of clarifying language used in the subsequent claims, it is submitted that the language "punch lock" or "punch tab" is intended to denote those locks or tabs which are physically engaged with openings, apertures or working surfaces by a jamming or punching action of the tab into engagement with the aperture. Usually, this jamming and punching function involves deformation or bending of one or more punch tabs during the insertion step. The language "chad" denotes the movable piece of packaging material which fills the apertures **16, 17, 160**, etc.

What is claimed is:

1. In a wrap-around article carrier of the type utilized to contain a plurality of articles of generally similar confirmation, said article carrier having a pair of overlapping end margins, said end margins being operative to overlap in at least two different positions defining a long overlap and a short overlap, an improved punch lock device comprising a plurality of apertures formed in one end margin, said other end margin being formed with a plurality of punch tabs, which punch tabs are staggered relative to said other end margin, each mating with a corresponding aperture, one of said punch tabs being operative to make a punch lock with its mating aperture upon the occurrence of a long overlap and the other of said punch tabs being operative to engage and effect a punch lock with its mating aperture upon the occurrence of a short overlap.

2. In a wrap-around article carrier of the type utilized to contain a plurality of articles of generally similar confirmation, said article carrier having a pair of overlapping margins, said margins being operative to overlap in at least two different positions defining a long overlap and a short overlap, an improved lock device comprising a plurality of apertures formed in one margin, said apertures being staggered with respect to their distance from the edge of the end margin in said apertures are formed and each having a side edge defining a work surface, said other margin being formed with a plurality of punch tabs each mating with a corresponding aperture, one of said punch tabs being operative to make a punch lock

with its mating aperture upon the occurrence of a long overlap and the other of said punch tabs being operative to engage and effect a punch lock with its mating aperture upon the occurrence of a short overlap.

3. In a wrap-around article carrier of the type utilized to contain a plurality of articles of generally similar confirmation, said article carrier having a pair of overlapping margins, said margins being operative to overlap in at least two positions defining a long overlap and a short overlap, an improved lock device comprising an aperture formed in one margin, said aperture having at least two work surfaces, said other margin being formed with a mating punch tab, said punch tab being operable to selectively cooperate with a first work surface upon the occurrence of a long overlap to effect a punch lock and with a second work surface upon the occurrence of a short overlap to effect a different punch lock.

4. In a punch lock device for a wrap-around article carrier blank whose end margins overlap, the improvement comprising forming one end margin of the blank with a punch tab and forming the other margin of the blank with a cooperating single aperture having at least two working surfaces, said punch tab being operative to effect a punch lock when said margins are overlapped to a first dimension to register with a first working surface defining a first perimeter dimension in a completed carrier and said punch tab being operative selectively to effect a punch lock when said margins are overlapped to a second dimension to register with said second working surface corresponding to a second perimeter dimension.

5. In a punch lock device for a wrap-around article carrier blank whose end margins overlap, the improvement comprising forming one end margin of the blank with a punch tab having two working portions and forming the other margin of the blank with a cooperating aperture, a first portion of said punch tab being operative when said margins are overlapped to a first dimension to effect a first punch lock corresponding to a first perimeter dimension in a completed carrier and a second portion of said punch tab being operative when said margins are overlapped to a second dimension to effect a second punch lock corresponding to a second perimeter dimension.

References Cited

UNITED STATES PATENTS

1,885,492	11/1932	Trew	217—3
1,991,746	2/1935	Hiatt	217—3
2,649,957	8/1953	Gapstur	206—45.21 X
3,128,010	4/1964	Forrer	229—40 X
3,361,331	1/1968	Weiss	229—40
3,395,791	8/1968	Graser.	
3,410,397	11/1968	Cato	229—40 X
3,424,368	1/1969	Forrer	229—40

DAVIS T. MOORHEAD, Primary Examiner

U.S. Cl. X.R.

206—65; 217—3