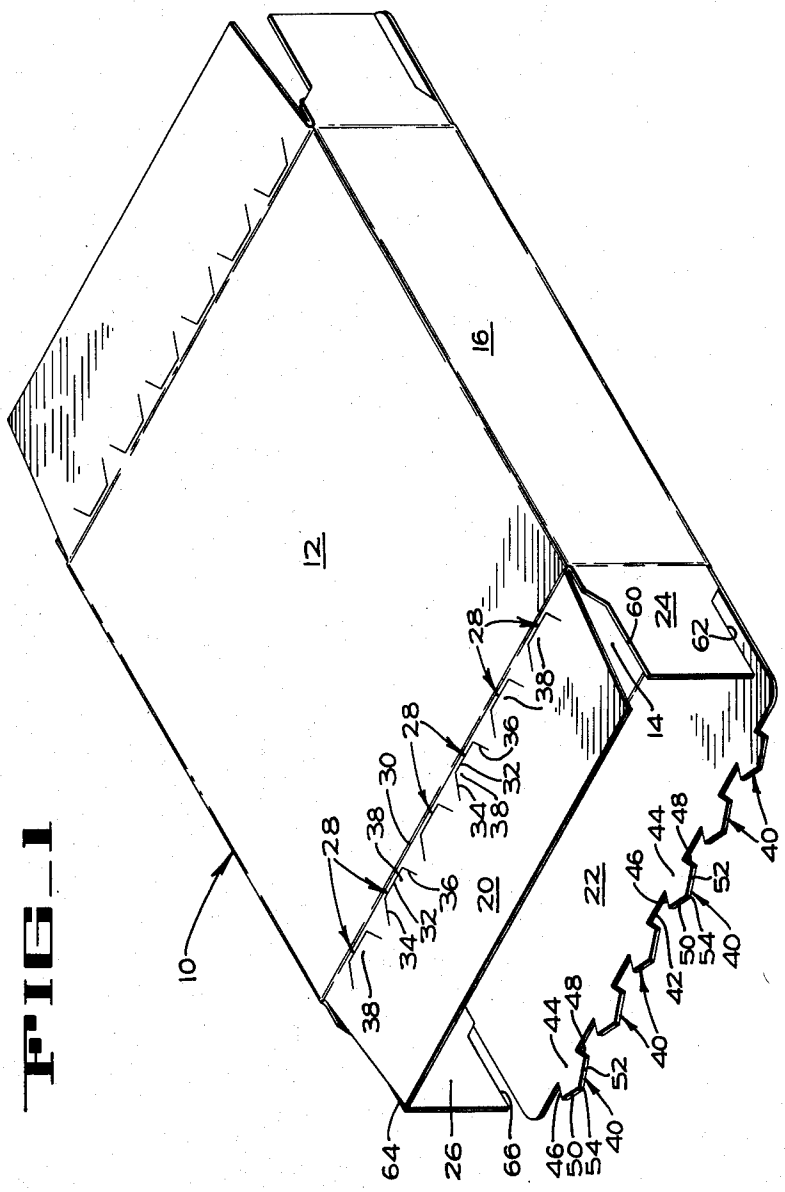
Oct. 30, 1962 R. K. GALLOWAY 3,061,168

CARTON STRUCTURE

Filed May 25, 1960 3 Sheets-Sheet 1

FIG. 1



INVENTOR
ROBERT K. GALLOWAY

BY Hans G. Hoffmeister
ATTORNEY

Oct. 30, 1962 R. K. GALLOWAY 3,061,168

CARTON STRUCTURE

Filed May 25, 1960 3 Sheets-Sheet 2

FIG_2

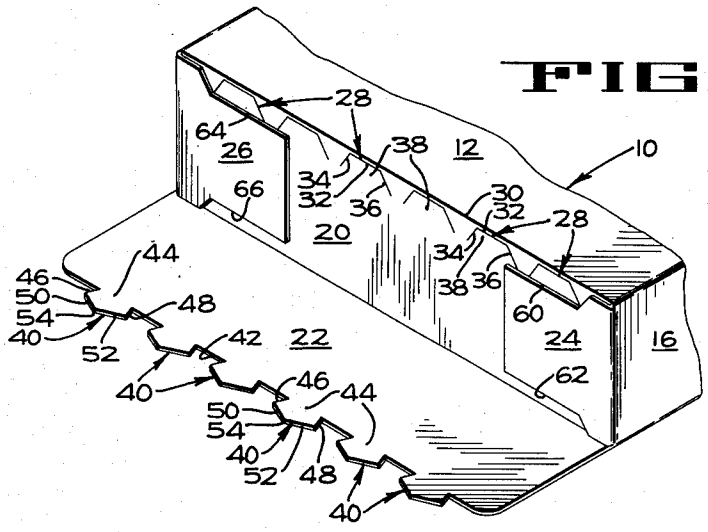


FIG_3

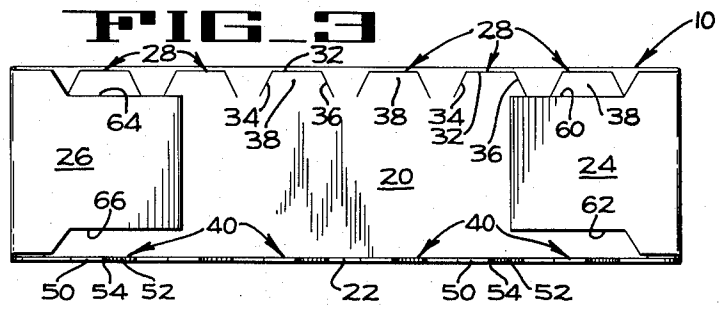
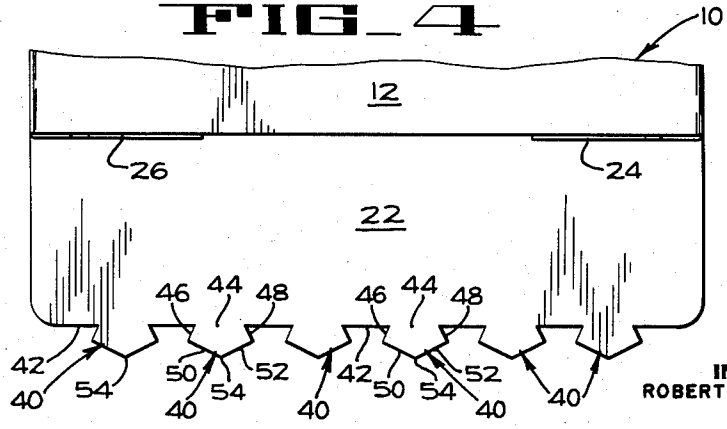


FIG_4



INVENTOR
ROBERT K. GALLOWAY

BY Hans G. Hoffmeister

ATTORNEY

Oct. 30, 1962 R. K. GALLOWAY 3,061,168

CARTON STRUCTURE

Filed May 25, 1960 3 Sheets-Sheet 3

FIG_5

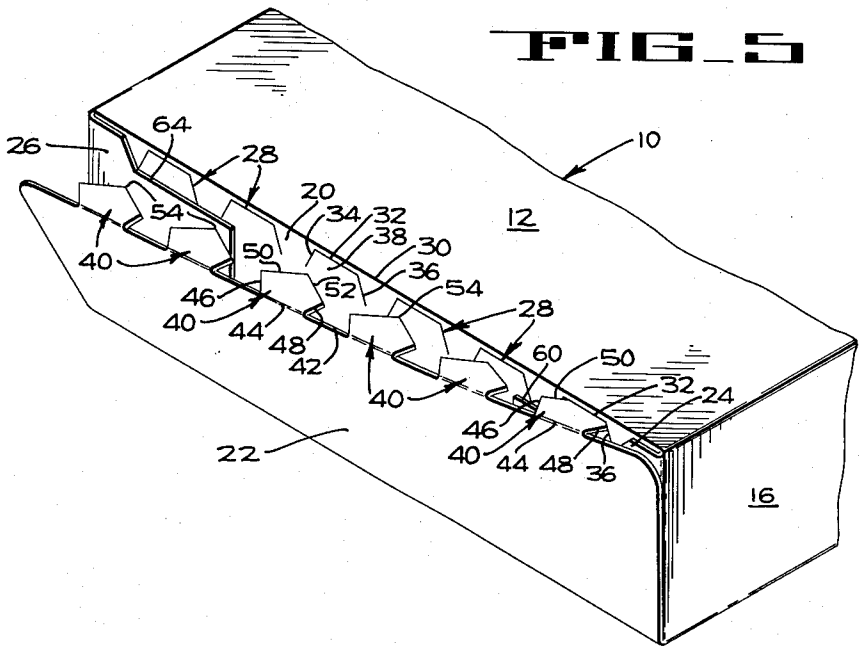
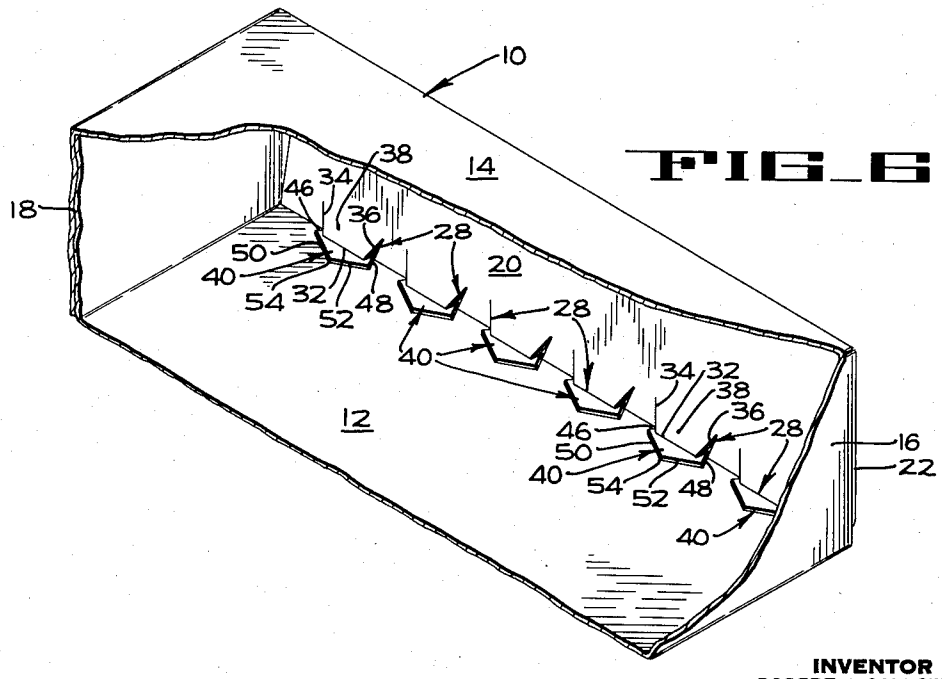


FIG_6



INVENTOR
ROBERT K. GALLOWAY

BY Hans G. Hoffmeister

ATTORNEY

United States Patent Office 3,061,168 Patented Oct. 30, 1962

3,061,168
CARTON STRUCTURE

Robert K. Galloway, Hoopeston, Ill., assignor to FMC Corporation, a corporation of Delaware

Filed May 25, 1960, Ser. No. 31,729
3 Claims. (Cl. 229—39)

The invention pertains to carton construction, and more particularly relates to arrangements for locking the closure flaps of a carton in closed relation.

An object of the present invention is to provide an improved carton construction.

Another object of the invention is to provide a paper carton including an improved arrangement for securely and tightly closing the carton.

Another object is to provide an improved carton closure wherein the end flaps of the carton are retained in the overlapping, carton-closing arrangement by an improved type of interlocking tab and slit construction.

Another object of the present invention is to provide a carton closure formed with interlocking tabs, which closure is devoid of any gaps or sifting spaces.

Another object of the present invention is to provide a carton closure which can not be opened without mutilation.

Another object of the present invention is to provide a carton closure which will not bulge or gap, and wherein the locking edge is not disfigured by projecting edges of locking slits.

Another object of the present invention is to provide a closure for a carton which imparts thereto improved resistance to crushing.

Other objects and advantages of the present invention will become apparent from the following detailed description and the accompanying drawings, wherein:

FIG. 1 is an isometric of a carton incorporating the present invention.

FIG. 2 is a fragmentary isometric illustrating one end of the carton of FIG. 1 with the end thereof partially closed.

FIG. 3 is an end elevation of the carton illustrated in FIG. 2.

FIG. 4 is a fragmentary plan of the carton illustrated in FIG. 2.

FIG. 5 is a fragmentary isometric similar to FIG. 2 and illustrates one method of inserting the locking tabs of the carton into their respectively associated slits.

FIG. 6 is a fragmentary isometric of the carton inverted and partially broken away to illustrate the relationship between the tabs and slits in fully closed and locked relation.

The carton 10 of the present invention is of rectangular configuration and comprises a top panel 12, a bottom panel 14 and two side panels 16 and 18. Since the closure constructions at both ends of the carton are the same, only one will be described in detail. Four end flaps 20, 22, 24, and 26 are connected to the top panel 12, bottom panel 14, side panel 16, and side panel 18, respectively, and project therefrom. A plurality of slits 28 are formed in the flap 20 adjacent the crease line 30 between the end flap 20 and the top panel 12. As illustrated in FIG. 3 each slit 28 has a flat base portion 32 and two straight diverging side portions 34 and 36, each intersecting the base portion 32 in an obtuse angle. Thus, each slit 38 defines a flap-like tongue 38 which at its wider end is integral with the end flap 20 and which has side edges that incline toward each other in the direction of the narrower, free end of the tongue. The straight base portion 32 of the slit 38 is parallel to the crease line 30 and is spaced therefrom a distance substantially equal to the

thickness of the cardboard stock of which the carton 10 is made.

A plurality of substantially diamond-shaped locking tabs 40 project outward from the outer edge 42 of the end flap 22 associated with the bottom carton panel 14. The locking tabs 40 are best illustrated in the plan view (FIG. 4) and each comprises a root portion 44 integral with the flap 22. The root portion 44 is of substantially the same width as the length of the base portion 32 of the associated slit 28. Two diverging side edges 46 and 48 project outward from the root 44. Two end edges 50 and 52 extend substantially perpendicularly from the outer ends of the side edges 46 and 48, respectively, and meet at a point 54.

The tabs 40 correspond to the slits 28 in both number and respective transverse positions, so that each tab 40 is adapted to enter one of the slits 28 when the carton is closed in a manner presently to be described. In the form of the invention shown, the slits 28 are all identical, as are also the tabs 40, although the invention is not limited to identity between the slits or between the tabs in the event that special conditions might make it desirable to depart therefrom.

In effecting closure of the carton end, the flap 20 is first folded inward until it is substantially perpendicular to the panel 12. The two flaps 24 and 26 are then folded inward until each is substantially perpendicular to its associated end panel 16 or 18, and thus disposed in overlapping relation to the flap 20, as illustrated in FIG. 2. It will be noted that the top and bottom edges of the flap 24 are cut back as indicated at 60 and 62, respectively. The cut back top edge 60 exposes one or more of the slits 28 in the flap 20 adjacent the associated side of the carton, thus to avoid interfering with the entry of the associated tab or tabs 40 thereinto. The flap 26 is similarly cut back as illustrated at 64 and 66.

After the side flaps 24 and 26 are folded inward, the tabs 40 are folded upward to a position substantially perpendicular to the flap 22. The flap 22 is then folded upward progressively from one side toward the other so that the tabs 40 are inserted into the slits 28 successively, progressing from one side of the carton toward the other, much in the same manner as a zipper fastener is closed. Because of the progressive action of the insertion of the tabs 40 the point of each tab between the side edge 48 and end edge 52 thereof enters the associated slit 28, the tab then slides sidewise into the slit 28 and the opposite point of the tab then is pushed through the slit.

After the tabs 40 have been inserted, the tongues or flaps 38 press thereagainst as best illustrated in FIG. 6, so that each tab 40 is not permitted to move downward to the wide portion of the associated slit 28. Since the width of any portion of a tab 40, except right at the root 44 thereof, is greater than the length of the base portion 32 of a slit 28, the tabs cannot be withdrawn from the slits without mutilation. In this manner the carton is firmly locked in its closed relation.

Moreover, since the root 44 of each tab 40 is seated within the base portion 32 of the associated slit 28, and since these parts of the tab and the slit are of the same linear extent transversely of the carton 10, the outer, or tabbed end of the overlying flap 22 is firmly restrained from moving laterally relatively to the inner, or hinged end of the underlying flap 20. In this manner, the carton is effectively held in a squared condition, since the tightly interfitting tabs and slits effectively prevent the wracking distortion of the carton end that would be possible if the tabs were narrower than the parts of the slits in which they seat.

Thus, the carton closure of the present invention im-

parts maximum crushing strength to the closed carton, which particularly adapts the carton for use under circumstances requiring that a number of the cartons be stacked one on top of another.

The tight fit of the tabs **40** within the slits **28**, in cooperation with the relatively large number of tabs and slits, holds the outer or distal end of the outermost flap of the closed carton tightly against the underlying flaps **20**, **24** and **26**, thus preventing the gapping that is characteristic of non-glued cartons of more conventional construction. Thus, the outermost flap **22** of the closed carton is flat and its tab-bearing edge is straight. These features contribute to the neat, finished appearance of the carton after being filled and closed, and eliminates the projecting edges of carton stock that characterize cartons having slits cut directly within their fold lines.

Since the portions of the slits **28** within which the tabs **40** seat are completely filled thereby, sifting of powdered material through the closure of this invention is minimized. The disposition of the side flaps **24** and **26** between the flap **20** and the flap **22**, rather than inward of both flaps **20** and **22**, likewise contributes to the sift-proof characteristic of the carton **10**.

While a preferred embodiment of the invention is described herein, it should be noted that various changes may be made therein without departing from the spirit of the invention as defined in the appended claims.

The invention having thus been described what is claimed and desired to be secured by Letters Patent is:

1. A carton structure comprising top, bottom and side panels, end flaps connected to said top and bottom panels by crease lines and projecting therefrom, one of said flaps having a plurality of slits therein adjacent the associated crease line, each of said slits having a base portion parallel to said associated crease line and diverging side portions, and a plurality of tabs projecting from the outer edge of the other of said flaps, said tabs corresponding in both number and respective transverse positions to the slits so that each tab is opposed to one of the slits for entry thereinto, each tab including a root portion integral with the associated end flap and corresponding in width to the length of the base part of the associated slit, each tab having side edges spaced apart at their outer ends a distance greater than the width of the root portion, and end edges extending from said outer ends of the side edges and converging to a point at the outer extremity of the tab.

2. A carton structure comprising top, bottom and side panels, end flaps connected to said top and bottom panels by crease lines, one of said flaps having many small closely spaced slits formed therein adjacent the associated crease line, each of said slits having a base portion parallel to the associated crease line and outwardly diverging side portions, the base portions of said slits being spaced from said crease line of the associated end flap a distance substantially equal to the thickness of the carton stock, and a corresponding number of substantially diamond shaped tabs projecting from the outer edge of the flap associated with said bottom panel and adapted to be inserted into said slits, said tabs each comprising a root portion connected to said bottom flap, diverging side edges and converging end edges, said root portion being of substantially the same width as the length of the base portion of one of said slits.

3. A carton structure comprising top, bottom and side panels, end flaps connected to each of said panels by crease lines and projecting therefrom, the flap associated with said top panel having many small closely spaced slits formed therein adjacent the associated crease line, each of said slits having a base portion parallel to the associated crease line and diverging side portions, the base portions of said slits being spaced from said crease line a distance substantially equal to the thickness of the carton stock, the upper edge of each of the flaps associated with said side panels being cut back to clear the slits in said top flap, and a corresponding number of substantially diamond shaped tabs projecting from the outer edge of the flap associated with said bottom panel and adapted to be inserted into said slits, said tabs each comprising a root portion connected to said bottom flap, diverging side edges and converging end edges, said root portion being of substantially the same width as the length of the base portion of one of said slits, said converging end edges meeting at a point.

References Cited in the file of this patent

UNITED STATES PATENTS

1,767,734	Brown	June 24, 1930
2,190,433	Palmer	Feb. 13, 1940
2,675,160	Buttery	Apr. 13, 1954
2,867,320	Andre	Jan. 6, 1959
2,872,036	Forrer	Feb. 3, 1959
2,944,717	Lynch	July 12, 1960
2,999,626	McDermott	Sept. 12, 1961