July 3, 1956 W. W. WAGNER, JR 2,753,104

EASY OPENING CARTON

Filed Sept. 1, 1954

FIG. 1.

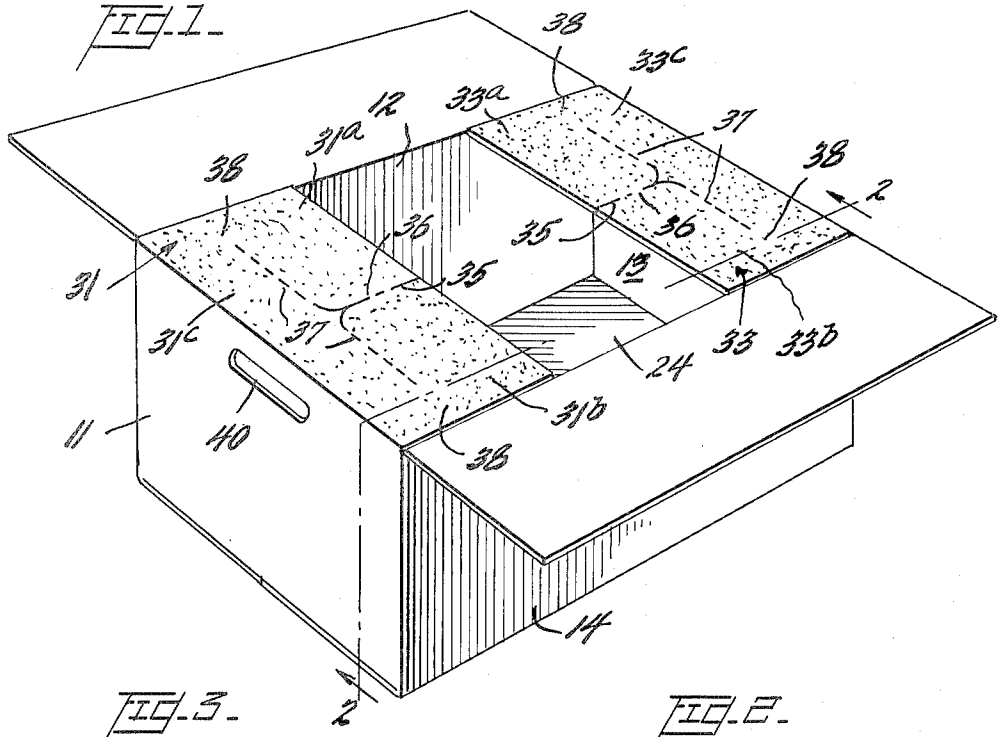


FIG. 3.

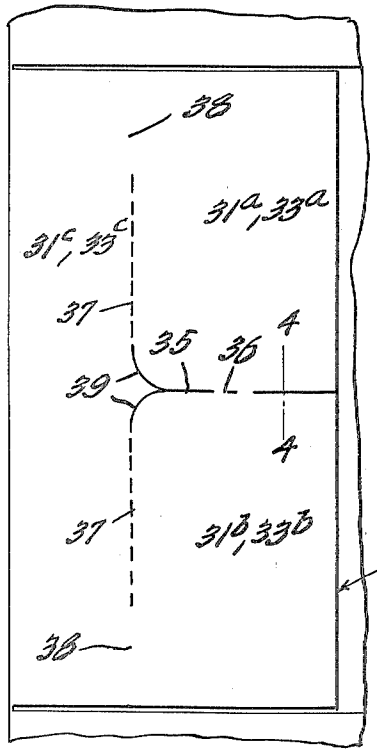


FIG. 2.

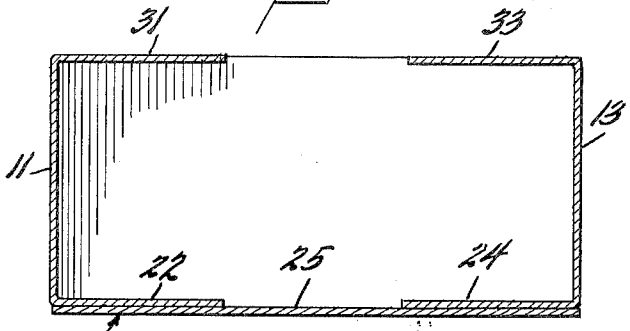


FIG. 5.

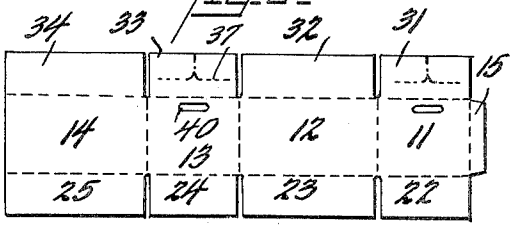
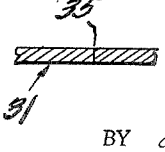


FIG. 4.



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United States Patent Office 2,753,104 Patented July 3, 1956

2,753,104

EASY OPENING CARTON

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Application September 1, 1954, Serial No. 453,521

1 Claim. (Cl. 229—51)

This invention relates to cartons or shipping containers constructed of cardboard, fiberboard, pasteboard, corrugated board or the like and is directed more particularly to cartons of the type having a bottom, side walls, and a top formed of flaps hingedly connected to the side walls and adhesively or otherwise connected together in overlapping relationship.

It is well known that cartons of the class described are often exceedingly difficult to open by hand. As the carton must withstand rough handling, stacking, dropping without rupture or appreciable deformation even with contents of heavy weight, the material employed must be of high bursting and tear strength and the adhesive or other securing means of extreme tenacity. The manual opening of such a box requires almost brute strength and it is frequently necessary to employ knives or other cutting means to gain access to the interior thereof.

As a solution to this problem, it has been suggested to localize the areas to which the adhesive is applied or to provide one or more of the flaps with perforations defining removable sections, adhesive being interposed between these sections and overlapping areas of other flaps. In either case, it is difficult to arrive at a balanced condition where the carton may be readily opened by hand but will not accidentally come apart during handling, shipping, etc. In the latter case, the result of easy accessibility is often not attained due to incomplete or mis-spaced perforations and opening is in many instances defective, the non-removable flap sections being torn or split by the separating action deviating from the lines of perforation.

It is therefore the object of this invention to provide an easy opening carton in which certain of the adhesively connected flaps are formed with removable sections incompletely defined so as to be readily detachable but to resist accidental separation.

A further object of the invention is to provide a carton having overlapping sealing flaps secured together substantially throughout their overlapping area, wherein to facilitate opening sections of the overlapping portions of certain of the flaps are detachable from the remainder of the flaps and are retained by the flaps to which they are secured, the attachment of the remaining portions of the certain flaps preventing accidental opening of the carton but being separable upon intentional opening thereof.

Another object of the invention is to provide a carton having overlapping sealing flaps, certain of which have sections detachable from each other and the remainder thereof, the detachable sections being so defined as to avoid undesirable tearing of the remainder of the flaps during opening of the box by deviation of the separating action from the lines of definition.

Other objects and advantages of the invention will be revealed by the following detailed description when considered in connection with the accompanying drawings in which,

Fig. 1 is a perspective view of an assembled carton designed in accordance with this invention, the normally

overlying flaps being shown open to reveal the novel inner flap construction;

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged plan view of one of the inner flaps;

Fig. 4 is a fragmentary section of an inner flap taken along line 4—4 of Fig. 3; and

Fig. 5 is a plan view of the blank from which the novel carton is formed.

In general, the carton of the present invention includes a bottom, side walls, and a top wall formed by flaps joined to the upper edges of the side walls, which flaps are folded over and secured in overlapping relationship during the sealing or closing operation. Certain of the flaps, the inner flaps, for example, are provided with adjacent sections at the inner end thereof which are detachable during opening from the remainder of these flaps, the detachable sections being separated from each other by a shear line and being connected to the remaining section by a line of perforation extending over the major portion of the common periphery. In the preferred embodiment, the line of perforation extends at right angles to the shear line separating removable sections and to eliminate tearing beyond the line of perforation in the direction of the shear line of that flap section which remains attached to the carton, the shear line is given a smooth right-angular bend on both sides prior to its connection with the line of perforation.

Turning now to a detailed description of the invention, it will be seen from Figures 1 and 5 that the carton is of one-piece construction and comprises the principal side wall panels 11, 12, 13 and 14 hingedly connected together by means of the usual score lines. Projecting from one of the end panels and hingedly connected thereto is a tab 15 which is adapted to be secured to the free edge of the other end panel by means of staples, adhesive, or the like to form a rectangular tube-like body. To close off the lower opening of this body, a bottom 21 is provided which may take any one of many well known constructions, for example, a plurality of bottom flaps 22, 23, 24 and 25, each hingedly connected to the lower edge of one of the side wall panels, which flaps are folded inwardly into overlapping relationship and secured in this position by means of adhesives, staples, or the like. The top of the carton is also formed in the usual manner from flaps 31, 32, 33 and 34 hingedly connected to the upper edges of side wall panels 11—14 which flaps are adapted to be folded inwardly and secured in overlapping relationship to seal the carton. As is common, opposite pairs of the top flaps, when in sealed or closed relationship, occupy a common plane and at least one of these opposite pairs, preferably the outer pair 32, 34, when in juxtaposed position, have a combined area equal to that enclosed by the four side walls so that the upper surface of the top is formed wholly by the pair of flaps. It is also usual for the inner edges of this pair to meet at the center line of the box although this is not altogether necessary and the line of juncture between this pair may be offset with respect to the center line if desired, it being understood that, in any event, this pair is coterminus, which is to say, that they meet at a substantially common line. Generally, the combined area of the other pair of flaps, inner flaps 31, 33, is less than that encompassed by the carton so that the inner edges of these flaps are spaced apart.

Now in accordance with the novel aspects of this invention, one of these opposite pairs of flaps, preferably inner pair 31, 33, is provided with removable sections which during opening of the carton are detached from the remainder thereof and move with and as a part of the overlying flaps 32, 34. For this purpose, a shear line or slit 35 is formed in each of inner flaps 31, 33, beginning at the inner edge thereof and extending trans-

versely of that edge a major portion of the distance to the axis of the hinge connection of the flap to its corresponding side wall. Preferably, the shear **35** is interrupted for very short distances, say about a quarter inch, at one or more points along its length to provide a tab-like connection **36** between the detachable portions of the flap which connection tends to resist or prevent unintentional separation of these portions. At its inner termination, the shear line **35** joins or connects with a line of perforation **37** extending on either side thereof parallel to the inner edge of the flap and toward its side edges. The perforation line **37** stretches from the shear line **35** over a major portion of the distance to the side edge of the flap but a minor portion of that distance, as at **38**, is left fully connected to the remainder of the flap for a purpose to be discussed shortly.

I have observed that if the shear **35** makes a sharp right angular intersection with the perforation line **37**, there is a tendency when the box is opened and the removable portions pulled apart for the separating action not to follow the line of perforation but to proceed into the portion of the flap which remains attached to the side wall with the result that the perforation lines are ineffectual. To prevent such an occurrence, the inner termination of the shear line is branched and smoothly curved in a right angle bend prior to its juncture with the line of perforation on both sides thereof as at **39**. Thus, when the box is opened the separating action follows the shear line **35** around the curved portion thereof and is already moving in the direction of the perforation line before the same is encountered; consequently, the tendency is for the action to continue to move in that direction and to proceed along line of perforation rather than to depart therefrom.

It will thus be seen that, in broad terms, the shear line **35**, the perforation line **37** and the side edges define on each of the inner flaps **31**, **33** two adjacent removable sections **31***a*, **31***b*, **33***a*, **33***b* and a section **31***c*, **33***c* which remains attached to the side walls of the carton. It is contemplated by this invention that where, as is the normal case, adhesives or glue is used as the means for securing the overlapping flap portions in sealed relationship that adhesive would be applied substantially throughout the entire overlapping area, which is to say, that where the adhesive is applied on the inner flaps it would be applied substantially over the full area thereof, on the attached sections **31***c*, **33***c* as well as on the detachable sections **31***a*, **31***b*, and **33***a*, **33***b*, as indicated by the stippling in Fig. 1. Alternatively, if the adhesive is to be applied to the overlying flaps **32**, **34**, then at least the end portions thereof corresponding to the area of the inner flaps overlapped thereby would be virtually completely covered. Where other means of attachment is desirable, that means would be used on the attached sections of the flap as well as the detachable sections thereof. The reasoning behind this practice is that if the attachment means were used only on the detachable sections of the flap and, due to rough handling, these sections should become separated from the remainder of the flap, the outer flaps would then swing outwardly, leaving the box open. However, by using the attachment means throughout the overlapped area the connection between the attached inner flap section and the overlying outer flap not only serves to maintain the box closed even though the detachable sections should become separated, but also tends to resist such separation.

The extent of the inner flap area which should be left attached to the carton will vary in accordance with the over-all dimensions of the carton and, perhaps, with the weight of the contents thereof but in all cases the length of the attached section will be less than one-half of the dimension of the flap transversely of the inner edge and hinge axis. For example, in a carton having a length of about 16 inches, a width of about 11 inches, a height

of about 8 inches, and an inner flap length of about 5¾ inches, the length of the flap section which remains attached to the carton is about 2¼ inches, and except for very small or very large boxes, a variation of plus or minus one-half inch from this figure would be permissible, the longer flap section for larger boxes and the shorter flap section for smaller boxes.

The unperforated connection between the attached and detachable inner flap sections has generally the same function as that of the attached flap section, i. e., to assist in maintaining the top flaps in operative or closed relationship notwithstanding rupture of the perforation line **37**. As was also the case with the attached flap section, the extent of this unperforated connection will vary between boxes of different dimensions although it too should in all cases be less than one-half of the distance from the shear line **35** to the side edge of the flap. In a box having the dimensions previously specified, I have found an unperforated section of about 1¾ inches to be particularly satisfactory and except for very large and very small boxes, a variation of about plus or minus one-fourth inch will be permissible and desirable.

In similar fashion, the radius of curvature of the bend in the branched end of the shear line may vary among various types of boxes. In the box already identified, a radius of three-fourths inch is advantageous and for most boxes a change of plus or minus one-fourth inch will accomplish the desired result.

The procedure for opening the carton will be more or less apparent. The medial portions of the outer flaps **32**, **34** are grasped in turn and pulled open, rupturing the tabs **36** and the perforations of corresponding sections **31***a*, **33***a* or **31***b*, **33***b*, as the case may be, and tearing the unperforated connection **38**. Because of the momentum developed during the initial phases of the opening action, the connections **38** do not present substantial resistance but give way relatively easily so that the use of undue force is not necessary.

An important feature of cartons constructed in the manner just described is that special or elaborate equipment is not required; the blank can be formed on a standard printer-slotter machine and the other steps, such as glue application and sealing, can be carried out with conventional apparatus. Such machinery is available in any carton-making factory and, consequently, the manufacture of cartons embodying the principles of this invention could be readily instituted with only such minor adjustments in such machinery as is ordinarily necessary and a major capital expenditure is wholly unnecessary.

The carton may, of course, be provided with any of the secondary features usually found on similar cartons, such as "punch-ins" **40** useful for carrying purposes. It will be understood by those skilled in the art that certain of the functional elements in the invention may be rearranged or varied in configuration, dimensions, etc., all without departing from the spirit of the invention except as may be defined in the appended claim.

Having thus described my invention, that which is claimed is:

An easy opening paperboard rectangular container for articles comprising two oppositely disposed end walls, two oppositely disposed side walls, a bottom and a top, said top comprising end flaps of substantially equal size extending from the said end walls, respectively, and folded toward one another, a perforated tear line extending between the lateral edges of said end flaps closer to the top edge of said respective end walls than to the outer edges of said end flaps, a single interrupted slit in each of said end flaps extending substantially perpendicularly from the outer edges of said end flaps to a point adjacent to the said perforated tear line therein, said slit being bifurcated at the said point to form two branches smoothly curved in opposite directions to connect said slit with said tear line, side flaps of substantially equal size extending, respectively, from the upper edges of said side

walls, said side flaps being folded toward one another to overlie said end flaps with their outer edges substantially abutting, and said side flaps being adapted to be adhesively secured to said underlying end flaps.

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