April 20, 1965 A. J LURIE 3,178,812

CARTON OPENING DEVICE

Filed Nov. 19, 1962 5 Sheets-Sheet 1

Fig. 1.

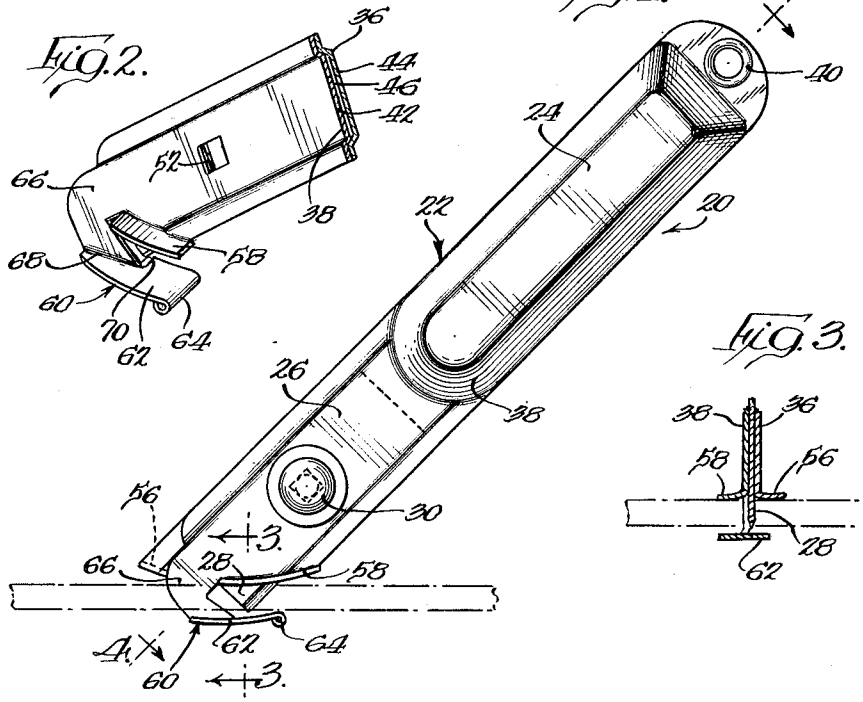


Fig. 2.

Fig. 3.

Fig. 4.

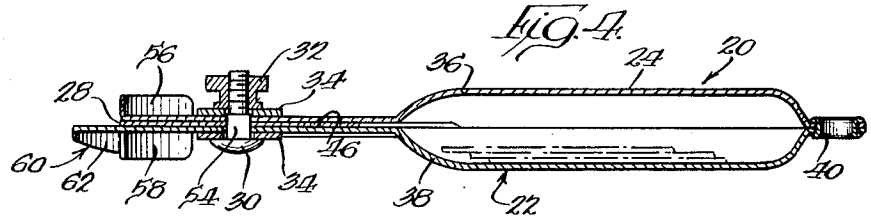
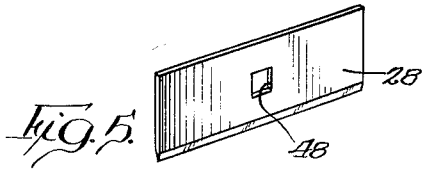


Fig. 5.



INVENTOR:
August J. Lurie
BY
B. Gordon Aller
Atty

April 20, 1965 A. J LURIE 3,178,812

CARTON OPENING DEVICE

Filed Nov. 19, 1962 5 Sheets-Sheet 2

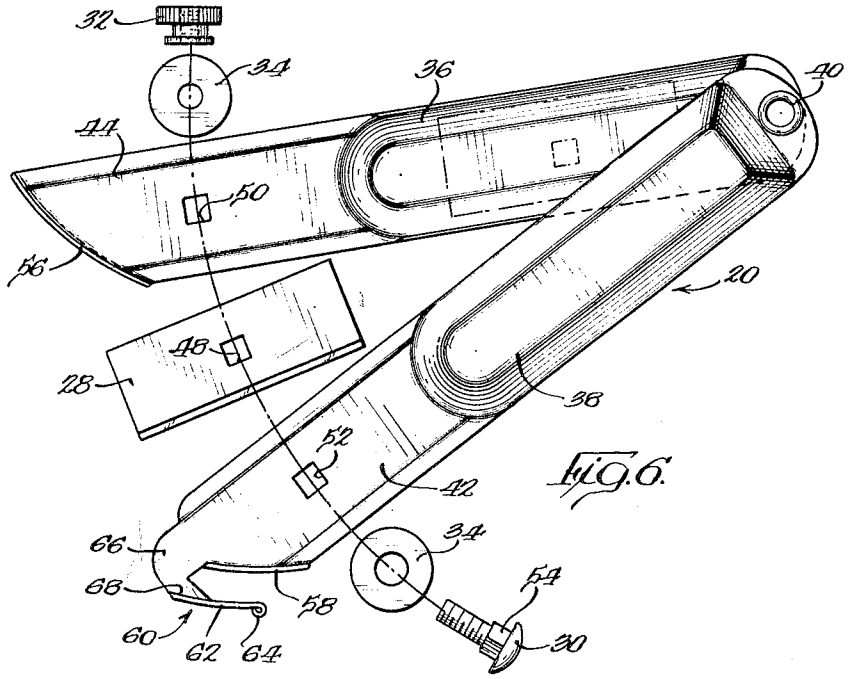


Fig. 6.

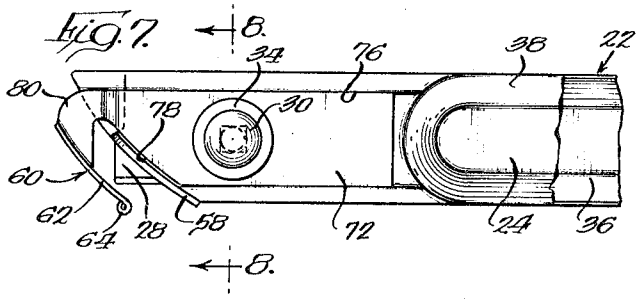


Fig. 7.

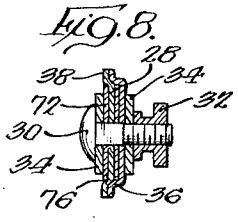


Fig. 8.

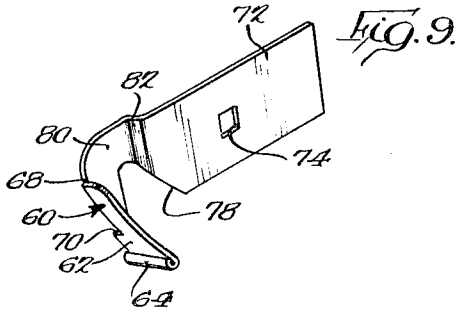


Fig. 9.

INVENTOR:
August J. Lurie
BY
B. Gordon Aller
Atty

April 20, 1965 A. J. LURIE 3,178,812

CARTON OPENING DEVICE

Filed Nov. 19, 1962 5 Sheets-Sheet 3

Fig. 10.

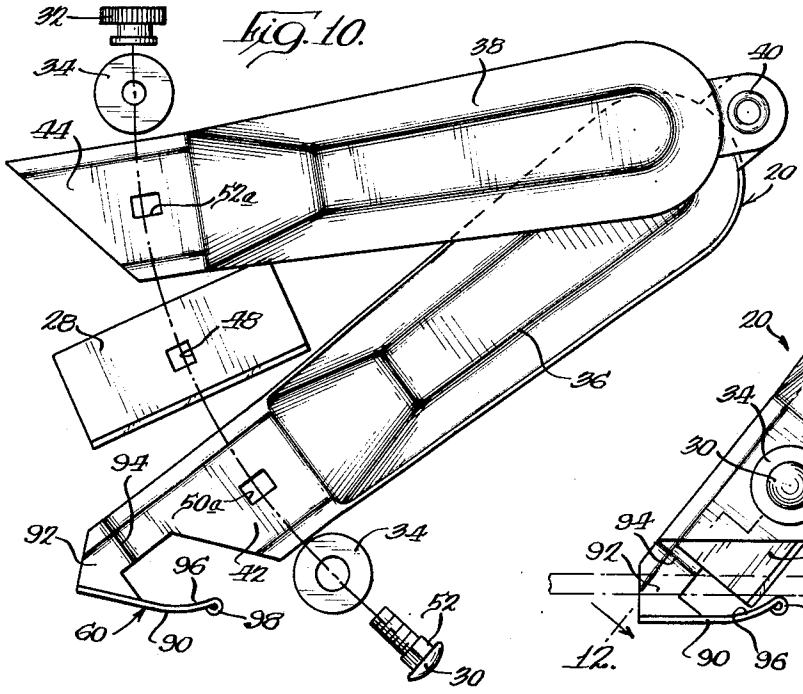


Fig. 11.

Fig. 12.

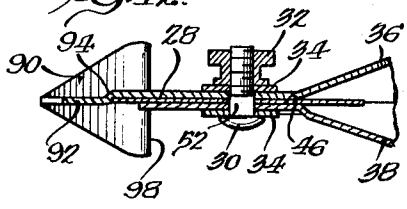


Fig. 13.

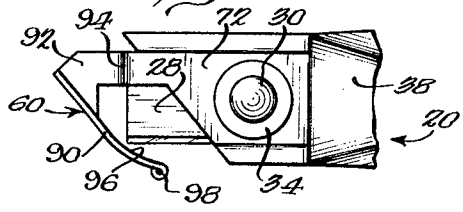
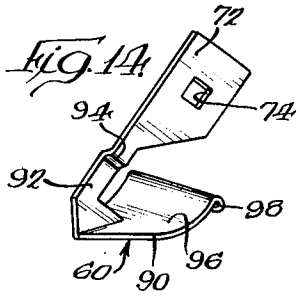


Fig. 14.



INVENTOR:
August J. Lurie
BY
B. Gordon Aller
Atty

April 20, 1965 A. J LURIE 3,178,812

CARTON OPENING DEVICE

Filed Nov. 19, 1962 5 Sheets-Sheet 4

Fig. 15.

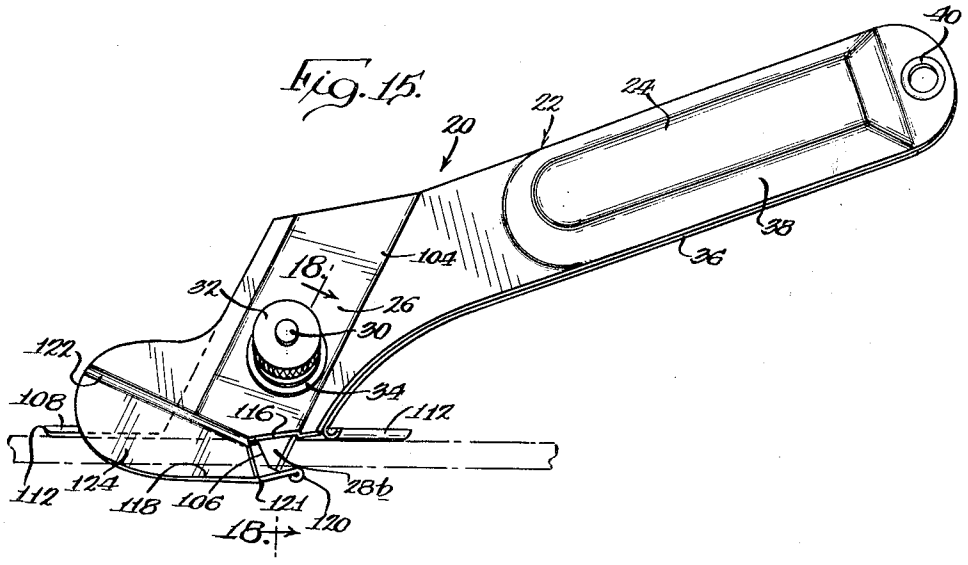


Fig. 16.

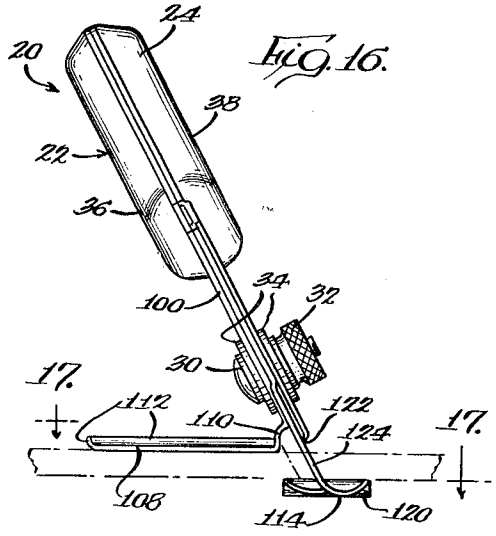


Fig. 17.

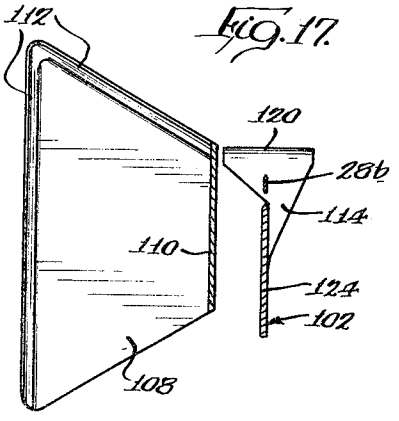
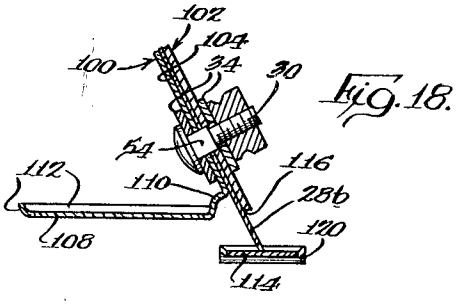


Fig. 18.



INVENTOR:
August J. Lurie
BY
B. Gordon Aller
Atty

April 20, 1965 A. J LURIE 3,178,812

CARTON OPENING DEVICE

Filed Nov. 19, 1962 5 Sheets-Sheet 5

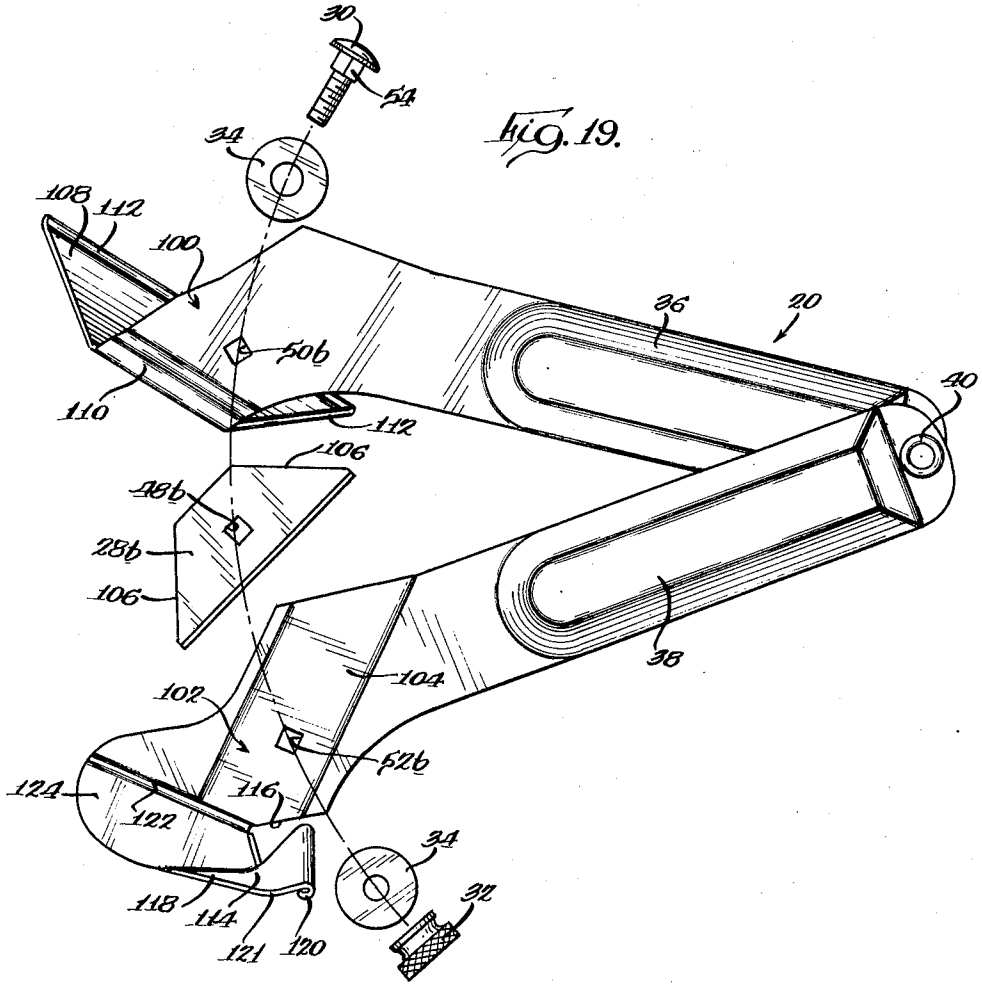


Fig. 19.

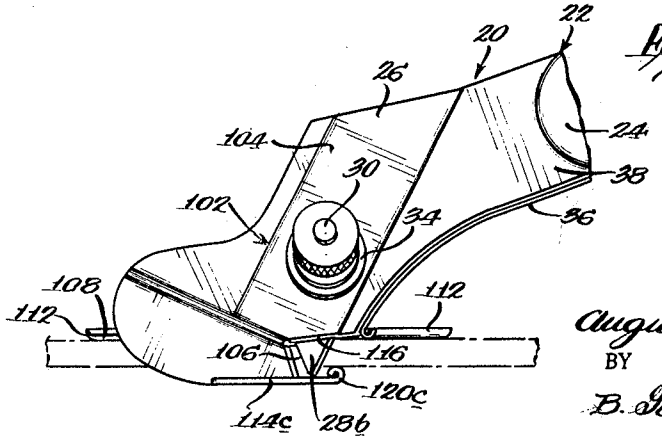


Fig. 20.

INVENTOR:
August J. Lurie
BY
B. Gordon Aller
Atty

United States Patent Office 3,178,812 Patented Apr. 20, 1965

3,178,812

CARTON OPENING DEVICE

August J. Lurie, 7018 35th St., Berwyn, Ill.

Filed Nov. 19, 1962, Ser. No. 242,033
9 Claims. (Cl. 30—2)

This application is a continuation-in-part of my copending application Serial No. 210,096, filed July 16, 1962, and now abandoned.

The present invention relates to carton opening devices adapted to open a paperboard carton in such manner as to expose the contents for marking and removal, and in particular, to such devices incorporating means to protect the contents of the carton against damage during the opening operation, and the user against injury.

This invention constitutes an improvement over the similar devices of my prior Patents Nos. 2,128,151, dated August 23, 1938; 2,187,590, dated January 16, 1940, and 2,978,807, dated April 11, 1961.

The continuing and ever increasing use of heavy paperboard cartons in the shipment of goods in commerce is well known. This is especially true with respect to canned and packaged foods. In order that such heavy cartons be used economically, the glue sealing the flaps is of the least expensive type, and makes such cartons almost impossible to open by separating the glued surfaces from one another. This is advantageous from the shippers' standpoint, since the carton will not be inadvertently opened, but it presents a serious problem when the cartons are received at the retail outlets and have to be opened so that the contents may be marked and placed on the shelves for sale.

The devices of my previously mentioned patents have found widespread use in enabling such cartons to be opened with a minimum of effort and time on the part of the stock boys, but unless the cutting blade was precisely positioned with respect to the guiding flanges, it sometimes occurred that the contents of the carton were damaged. For example, where the contents comprise a number of small paperboard packages, usually of appreciably light weight paperboard for the packaging of detergents, soaps, breakfast foods, and the like, the cutter blade, if projected too far, would cut and damage one or more of these inner cartons or packages, which then could not be sold, resulting in a loss to the market operator.

Also, the projecting corner of the sharp cutting blade was a source of possible injury to the user.

It is therefore a principal object of the present invention to provide a new and improved carton opening device of the type incorporating a projecting cutting blade, having a guard which may be inserted to the inner face of the carton to be opened, thereby to prevent contact between the carton severing blade and the contents of the carton.

Another object is to provide a new and improved carton opening device of the type incorporating a projecting cutting blade, having a removable guard lying beyond the cutting corner of the blade.

Another object is to provide a new and improved carton opening device of the type incorporating a projecting cutting blade guard which also functions as a guide on the inner surface of the carton.

Another object is to provide a new and improved carton opening device wherein there are provided a guide for sliding along the outer surface of the carton, a guide and blade guard for sliding along the inner surface of the carton, and the two maintain the blade at an angle other than normal to the carton wall being cut.

Other objects and advantages of this invention will become apparent from the following description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an elevational view of the carton opening device of the present invention, showing it applied to a heavy paperboard carton depicted in dot-dash lines;

FIG. 2 is a perspective view of the forward or the cutting end of the device, with the blade removed, showing the relationship of the parts and the guard;

FIG. 3 is a fragmentary sectional view, taken along the line 3—3 of FIG. 1, looking in the direction of the arrows;

FIG. 4 is a longitudinal sectional view, taken along the line 4—4 of FIG. 1, looking in the direction of the arrows;

FIG. 5 is a perspective view of the cutting blade;

FIG. 6 is an exploded elevational view of the device shown in FIG. 1, illustrating the parts and their relation to one another;

FIG. 7 is a view similar to FIG. 1, showing the forward or cutting end of the device of a modified construction;

FIG. 8 is a transverse sectional view, taken along the line 8—8 of FIG. 7, looking in the direction of the arrows;

FIG. 9 is a perspective view of the guard and mounting portion thereof incorporated in the modified form of FIG. 7;

FIG. 10 is an exploded elevational view, similar to FIG. 6, of another form of the device;

FIG. 11 is an elevational view of the forward end of the carton opening device shown in FIG. 10, showing the manner in which it is applied to the carton;

FIG. 12 is a sectional view taken along the line 12—12 of FIG. 11, looking in the direction of the arrows;

FIG. 13 is a view of the forward end of a cutting device of the type shown in FIG. 10, but a further modification thereof;

FIG. 14 is a perspective view of the guide and mounting portion of the modification shown in FIG. 13;

FIG. 15 is an elevational view similar to FIG. 1 showing another modification of the carton opening device;

FIG. 16 is a front end view of the carton opening device of FIG. 15, looking at it from the left side of FIG. 15;

FIG. 17 is a horizontal sectional view taken along the line 17—17 of FIG. 16 looking in the direction of the arrows;

FIG. 18 is a vertical sectional view taken along the line 18—18 of FIG. 15, looking in the direction of the arrows;

FIG. 19 is an exploded elevational view of the device shown in FIG. 15, illustrating the parts and their relation to one another; and

FIG. 20 is a fragmentary elevational view of the head of the device showing a modification of the form shown in FIGS. 15 to 19.

Referring first to FIGS. 1 through 6, the reference character **20** indicates the carton opening device in its entirety, and it comprises a handle **22** having a grip portion **24** and a blade securing portion **25**, a blade **28**, a stud **30**, thumb nut **32**, and washers **34**, the latter three elements clamping the blade in operative position.

The handle **22** is comprised of a pair of complementally shaped halves **36** and **38** which are pivotally interconnected at their outer ends by a hollow rivet **40**. At the blade mounting end **26** of the handle **22**, the ends are alternately provided with male **42** and female **44** portions laterally offset from the normal plane of the halves to define a blade receiving passage or recess **46** therebetween. The blade **28** is confined therein as seen in FIGS. 1 and 4, and has a corner projecting beyond the halves **36** and **38**, as shown most clearly in FIG. 1. The offset male-female portions provide shoulders to prevent the blade **28** from shifting in the passage or recess.

The blade **28** is provided with a square aperture **48** at its center, and the handle halves **36** and **38** are similarly

formed with square apertures **50** and **52**, respectively, all to receive the squared shank portion **54** of the stud **30**, thereby further accurately locating the blade in the passageway **46** with the proper exposure of its corner, as shown in FIG. 1.

The handle portions **36** and **38** are also respectively provided with slightly curved guiding flanges **56** and **58** which are adapted to ride upon the outer surface of the carton being opened. These facilitate the easy sliding movement of the cutting device along the surface of the carton and assist in properly positioning the projecting corner of the cutting blade with respect to the carton.

The handle **22** is formed with a guard **60**, the position and function of which are best shown in FIGS. 1 and 3. The guard **60** comprises a blade **62** having a curled or beaded forward end **64** which is adapted to be inserted into the interior of the carton. As most clearly seen in FIG. 2, the blade **62** is offset laterally from a forwardly projecting portion **66** of the handle half **38**. The projecting portion is bent at **68** and recessed at **70** so that the main body of the blade **62** lies opposite and slightly spaced from the projecting corner of the blade **28** in the manner shown most clearly in FIGS. 1 and 3. This insures that this corner of the blade cannot come into contact with the hands or other portions of the body of the user, and also insures that the blade will slide cleanly along the inner surface of the carton wall or top to prevent the corner of the blade from coming into contact with the boxes, cans, or packages of goods contained within the carton, thereby preventing inadvertent damage thereto.

In use, the blade **62** is inserted into the interior of the carton by piercing the wall or top thereof adjacent a corner, and then drawing the carton opening device from left to right (FIG. 1) along the wall or top in the manner described in my aforementioned patents. The guard blade **62** will slide between the inner surface of the carton wall and the carton contents, thus acting as an inner guide, while the cutting blade **28** will neatly and cleanly sever the top or carton wall, thereby opening the carton with no damage whatsoever to the contents.

A modified form of this invention is shown in FIGS. 7–9, wherein similar parts are given similar reference characters, and to the extent that the carton opening device is the same as that previously described, it will not be redescribed.

In this modification the guard **60**, instead of being integral with the handle half **38**, is a separate unit so that it may be incorporated, for example, into the carton opening device of my prior patents 2,187,590 and 2,978,807. The guard **60** is formed as a part of a supplemental generally rectangular element **72** having a squared aperture **74** therein adapted to be received on the squared portion of the stud **30** and to be clamped into the sandwich of elements in the manner shown in FIG. 8. The mounting element is adapted to fit into the recess **76** in the outer face of the element **38** at its forward end, and it has a curved edge portion **78** arranged to seat against the rear face of the guide flange **58**. The mounting member **72** includes a forwardly projecting portion **80** which is offset at **82** from the main body of the mounting member **72**, so as properly to position the guard blade **62** across the projecting corner of the cutting blade **28**. This offset also is needed to accommodate the condition that the guard is mounted on the outside of the sandwich of elements, while in the first described form it was formed integrally with the handle half **38**.

This guard functions in precisely the same fashion as that in the form shown in FIGS. 1–6, and its operation and use will not be redescribed.

Referring to FIGS. 10 through 14, there are shown still further modifications of the carton opening device. The reference characters which have heretofore been used in describing the parts in FIGS. 1 through 9 will be used in describing FIGS. 10 through 14.

One problem encountered in opening cartons, in addition to inadvertently damaging the smaller packages enclosed within the carton, is turning the corner and simultaneously protecting the contents. The form of carton opening device shown in FIGS. 10 through 14 is particularly well adapted for solution of this problem. Its principal differences from the forms of FIGS. 1 to 9 are the omission of the exterior surface guides **56** and **58**, providing somewhat more clearance to accommodate the carton material at the corner interiorly of the inner guide and guard **60**, and providing a somewhat more rounded leading nose on the guard.

The inner guide and guard **60** comprises a generally triangular blade **90**, with the apex of the triangle at a forward extension **92** of the handle half **36**. It will be observed from FIG. 12 that the blade **90** is substantially centrally located with respect to the extension **92**, which has an offset shoulder **94** to limit the forward or outward movement of the cutting blade **28**. The guide blade **90** is curved inwardly or toward the handle and the corner of the blade **28** at **96**, and terminates in a wide inwardly rolled nose portion **98** which facilitates sliding of the blade along the inner surface of the carton, affords additional protection against damage to the carton contents, and assists in turning the corner by providing a rounded surface which presents various line contacts with the corner and adjacent carton inner wall surfaces, thereby preventing gouging of the inner surface of the carton wall by the blade **90** and insuring a smooth even movement as the corner is met and turned.

It will be noted from FIG. 14 that the extension **92** is aligned with the blade **28** so that the guard **60** and its blade **90** are centrally located with respect to the knife and the knife blade **28**.

The handle halves **36** and **38** are provided with rectangular slots **50***a* and **52***a*, respectively, to receive the bolt **30** and to permit slight adjustment of the position of the cutting blade **28** relative to the handle and to the guide and guard **60**. It should also be noted that the handle extension **92** provides substantial clearance forwardly of the blade **28** to accommodate the carton material, particularly when turning the corners.

FIGS. 13 and 14 show the guard **60** with its blade **90** applied to an attachment of the general type shown in FIGS. 7, 8, and 9, wherein the body **72** is bolted to the exterior of the handle by means of the bolt **30** and projects forwardly thereof and beyond the cutting corner of the knife blade **28** to assume the position shown in FIG. 13. This attachment incorporates the extension **92** having the shoulder **94** to locate the guard **60** centrally with respect to the knife blade **28** so that it is properly positioned to assist in guarding the contents of the carton, and to facilitate turning the corners when the carton opening knife approaches a corner and has to be turned therearound.

It should be observed, however, that the curled or curved end **98** on the blade **90** can take various forms. In addition to that specifically shown in FIGS. 10 to 14, it may be a solid element formed integrally with the blade or attached thereto. It is important that it be curved to present a rounded surface to assist in moving the guide and guard **60** interiorly of the carton without digging into the carton walls, and without in any way damaging the carton contents.

Still another modification of the carton opening device **20** is shown in FIGS. 15 through 19 wherein the reference characters previously used are used to designate the same or similar parts. This form retains the advantages claimed for the modifications of FIGS. 10 to 14, but is easier to use, more certainly guided, and less costly to manufacture.

The pivotally interconnected handle halves **36** and **38** are integral, respectively, with head portions **100** and **102**, which have square apertures **50***b* and **52***b* adapted to receive the squared shank **54** of the stud **30**. The portions **100** and **102** are adapted to be brought into face

to face relation to align the apertures 50*b* and 52*b* and the portion 102 is offset to provide on its inner face a blade receiving channel, passage or recess 104 to receive cutting blade 28*b*. The blade 28*b* is similar to the blade 28 (FIG. 5) and has a securing and aligning aperture 48*b*, but at its ends it is angularly cut away at 106 for reasons which will become apparent hereinafter.

The head portion 100 has formed integrally therewith an outer carton surface guide 108 of relatively large area as seen from FIG. 17. The guide 108 is connected through a double offset joint 110 to the head portion 100 at an angle therewith in the range of 55° to 65° and preferably about 60°. The carton opening device is moved through the carton from left to right (FIG. 15), and the guide 108 at its leading and outer edges is upturned at 112 to provide a curved leading edge which will not gouge into the paper board of the carton and stop movement of the opening device.

The head portion 102 has formed integrally therewith an inner carton surface guide and contents guard 114. The guide and guard 114 is formed by notching the head portion at 116 and bending along the joint line 118 to bring the guide and guard 114 into general parallelism with the outer guide 108. At its forward edge the guide and guard is formed with a rolled bead 120 or the like to prevent gouging the carton's contents or the carton wall which would prevent the smooth and uninterrupted movement of the guide and guard along the carton wall. The guide and guard 114 is slightly curved at 121 so that edge of the bead 120 and the innermost (from the carton standpoint) portion of the guide and guard 114 lie in the same plane. This permits the guard and guide 114 to slide between the carton wall and carton contents in a tightly packed carton.

It will be observed from FIGS. 15, 16 and 19 that the head portion 102 is offset inwardly at 122 a distance about equal to the thickness of the metal from which the handle is made. This offset 122 is at the lower end of the blade receiving channel 104 and is for the purpose of aligning in the same plane the blade 28*b* and lower portion 124 of the head portion 102. It is the portion 124 that slides through the cut made in the carton by the blade 28*b*.

FIGS. 16 to 18 show that the guide 108 and the guide and guard 114 are generally parallel and are vertically spaced apart a distance not appreciably greater than the thickness of the heaviest paperboard stock conventionally used in shipping such things as foods, soaps, detergents and the like. This thickness is about 3/16 inch. These figures also show that the guide 108 and guide and guard 114 are laterally offset so that they are not opposed to one another on the outer and inner surfaces of the carton wall. This offset positioning of the guides prevents binding between the carton opening device 20 and the paperboard stock and facilitates turning the corners between adjacent side walls or between the top or bottom and a side wall.

The angular arrangement of the handle 22 accommodates the horizontal offsetting of the guide 108 and the guide and guard 114. It has also been found the angular arrangement of the handle is comfortable for the user and permits a clearer view of the cutter blade 28*b* as it slices through the carton walls.

As previously noted the blade 28*b* is cut away at 106. As seen in FIG. 15 this permits the cutting edge of the blade to project to the guide and guard 114, if desired, and to have it in the same plane as the portion 124 of the head. FIGS. 17 and 18 clearly show that with this arrangement the user's hands and clothing are fully protected against contact with the blade 28*b*.

Inasmuch as the use of the form of the carton opening device 20 is essentially the same as the prior described forms, the use and operation will not be redescribed.

The form shown in FIG. 20 is essentially the same as that shown in FIGS. 15 to 19 and described immediately above, except that the inner guide and guard 114*c* is generally flat and protecting bead 120*c* is formed on its upper face rather than the lower face. It should be understood that the beads 118 and 120*c* may be formed as a solid integral or soldered on roll, if desired.

It will be seen from the foregoing description that the objectives which were claimed for this device at the outset of this specification have been fully attained.

While preferred embodiments of the carton opening device constituting my invention have been shown and described, it will be apparent that numerous modifications and variations thereof may be made without departing from the underlying principles of the invention. It is therefore desired, by the following claims, to include within the scope of my invention all such modifications and variations by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

What I claim as new and desire to secure by United States Letters Patent is:

1. In a device for opening heavy paperboard cartons having a cutting blade, a handle to carry said blade, said handle being formed of complementally shaped halves with each handle half being formed to provide a blade retaining passage when said halves are aligned, each of said halves having a bulged portion at one end to form a grip and a laterally disposed guide flange at the other end, and a clamping screw to retain said blade between said halves and said halves in aligned position with a corner of said blade projecting beyond said guide flanges to cutting position, the improvement comprising, a bladelike guard secured to said halves by said clamping screw lying slightly beyond and across the exposed corner of said blade and in a plane perpendicular to the plane of said blade and parallel to the plane of said guide flanges to protect the contents of the carton against damage during the carton opening operation.

2. In a device for opening heavy paperboard cartons having a cutting blade, a handle having a blade receiving recess formed therein, and means for securing said blade in said recess with a corner of said blade projecting beyond said handle to cutting position, the improvement comprising, a generally triangularly shaped bladelike guide and guard carried by said handle lying slightly beyond and across the exposed corner of said cutting blade to protect the contents of the carton against damage during the carton opening operation with the base of said triangularly shaped guide and guard forming the leading edge thereof, and said guide and guard being formed to provide a curled nose across said leading edge base of its generally triangular shape to facilitate movement of said guide and guard on the inner surface of the carton and around the corners therein.

3. In a device for opening heavy paperboard cartons having a cutting blade, a handle to carry said blade, said handle being formed of complementally shaped halves and defining therebetween a blade receiving passage when said halves are aligned, each of said halves having a bulged portion at one end to form a grip, and a clamping screw to retain said blade between said halves and said halves in aligned position with a corner of said blade projecting from said passage to cutting position, the improvement comprising, an outer carton surface guide projecting outwardly from one of said handle halves, and an inner carton surface bladelike guide and guard carried by the other of said halves in a position slightly beyond and across the exposed corner of said blade to protect the contents of the carton against damage during the carton opening operation.

4. In a device for opening heavy paperboard cartons having a cutting blade, a handle to carry said blade, said handle being formed of complementally shaped halves and defining therebetween a blade receiving passage when said halves are aligned, each of said halves having a

bulged portion at one end to form a grip, and a clamping screw to retain said blade between said halves and said halves in aligned position with a corner of said blade projecting from said passage to cutting position, the improvement comprising, an outer carton surface guide projecting outwardly from one of said handle halves, and a bladelike inner carton surface guide and contents guard carried by the other of said halves in a position slightly beyond and across the exposed corner of said blade to protect the contents of the carton against damage during the carton opening operation, said outer carton surface guide and said inner carton surface guide and contents guard being generally parallel and vertically spaced.

5. In a device for opening heavy paperboard cartons having a cutting blade, a handle to carry said blade, said handle being formed of complementally shaped halves and defining therebetween a blade receiving passage when said halves are aligned, each of said halves having a bulged portion at one end to form a grip, and a clamping screw to retain said blade between said halves and said halves in aligned position with a corner of said blade projecting from said passage to cutting position, the improvement comprising, an outer carton surface guide projecting outwardly from one of said handle halves, and a bladelike inner carton surface guide and contents guard carried by the other of said halves in a position slightly beyond and across the exposed corner of said blade to protect the contents of the carton against damage during the carton opening operation, said outer carton surface guide and said inner carton surface guide and contents guard being horizontally offset so as to lessen the possibility of binding between the carton opening device and the paperboard of the carton.

6. In a device for opening heavy paperboard cartons having a cutting blade, a handle to carry said blade, said handle being formed of complementally shaped halves and defining therebetween a blade receiving passage when said halves are aligned, each of said halves having a bulged portion at one end to form a grip, and a clamping screw to retain said blade betwen said halves and said halves in aligned position with a corner of said blade projecting from said passage to cutting position, the improvement comprising, an outer carton surface guide projecting outwardly at an acute angle from one of said handle halves, and a bladelike inner carton surface guide and contents guard carried by the other of said halves in a position slightly beyond and across the exposed corner of said blade to protect the contents of the carton against damage during the carton opening operation, said outer carton surface guide and said inner carton surface guide and contents guard being generally parallel and vertically spaced, said outer carton surface guide and said inner carton surface guide and contents guard being horizontally offset so as to lessen the possibility of binding between the carton opening device and the paperboard of the carton.

7. A device as claimed in claim 6, wherein said angle is in the range between 55° and 65°.

8. A device as claimed in claim 6, wherein said angle is about 60°.

9. In a device for opening heavy paperboard cartons having a cutting blade, a handle having a blade receiving recess formed therein, and means for securing said blade in said recess with a corner of said blade projecting beyond said handle to cutting position, the improvement comprising, a bladelike guard and guide carried by said handle on a platelike member, said platelike member extending beyond the end of the handle in the same direction as the cutting edge of said cutting blade projects, said bladelike guard and guide being positioned at an angle to said platelike member to lie slightly beyond and across the exposed corner of said cutting blade to protect the contents of the carton against damage during the carton opening operation, and said platelike member being offset to a position in alignment with the projecting end of said cutting blade to bring that portion of said platelike member which extends through a slit cut in the carton into the same plane as the cutting blade so as to facilitate movement of the opening device during the carton opening operation.

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WILLIAM FELDMAN, *Primary Examiner.*