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# (54) DEVICE FOR OPENING CARTONS

GERÄT ZUM ÖFFNEN VON KARTONS

DISPOSITIF POUR OUVRIR DES CARTONS

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(56) References cited:
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**US-A- 4 291 461**



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## Description

**[0001]** The present invention relates to a device for opening waxed paper or plastics or metal foil coated paperboard cartons and the like containing liquid, semi-liquids or powders that may be poured of the kind having a winged sealed ridge closure. In particular, the invention provides a hand-held or wall-mounted means for enabling the seal closures of milk cartons and the like to be severed so that the carton may be readily opened and re-closed but not resealed as required.

**[0002]** The type of paper carton used particularly for domestic milk supply is well known. The form of carton is marketed under the Registered Trade Marks ELOPAK, or TETRAPAK. Such cartons are sealed by inclining the upper portions of the side walls inward with two opposite faces folded together to form so called wings and heat treating or otherwise sealing the mating internal extremities of the inclined portions to form a ridge. This ridge may be folded flat on the upper face of the carton or it may be left in an upstanding attitude so that the upper face of the carton appears gabled. The flat top types of cartons generally have tongues at each end of the folded ridge which are detachabley secured to the side walls of the carton to keep the ridge in a flat folded position for transportation and sales display. Printed on such cartons are opening instructions sometimes with illustrations. However, many people find the opening instructions difficult to follow. People who are not particularly dextrous find their failure to open the cartons very frustrating. Failed attempts to open the cartons as instructed can cause the wings to be torn, badly buckled or otherwise mutilated. This is hygienically undesirable and may cause the milk or other liquid in the cart to pour badly or to dribble down the outside of the carton.

**[0003]** It is known to cut the entire ridge closure from the upper face of the carton. This action enables the entire upper face of the carton to be opened but not readily closed. It is also known to cut off part or all of one of the wings to gain access to the contents of the carton. Neither solution is a satisfactory alternative to the suggested instructions on the cartons.

**[0004]** According to the present invention, there is provided a carton opening device having the features as defined in claim 1.

**[0005]** In a preferred embodiment the guide means is a bifurcated tongue which projects from the underside of the device in substantially parallel disposition to said first plane.

**[0006]** The severing means may include a first cutter for severing along said first plane and a second cutter for severing said sealed closure along a second plane meeting the first plane substantially in the middle of the length of the sealed closure and at an angle of between 45° and 150°. Preferably, the severing means comprises a thin cutting blade or blades. The severing means may be a shearing means, guillotine means or snipping means.

**[0007]** In a preferred embodiment, the device includes a second guide means for bearing on the sealed closure remote from and substantially parallel to the first guide means.

**[0008]** The present invention recognises that the suggested method of opening cartons would be satisfactory if the force required to release the carton closure by applying a force to the wings could be significantly reduced. The present invention facilitates the opening of cartons simply and cleanly. It severs and removes a segment of the closure ridge of the carton so that the wings are no longer secured together and are free to be opened in accordance with the general instructions.

**[0009]** The invention will now be described by way of example with reference to the accompanying diagrammatic drawings in which;

Figures 1 to 6 illustrate the stages of opening a carton according to the invention;
Figure 7 shows the optional range in which the carton closure ridge may be folded or severed;
Figures 8 and 9 illustrate blades for severing the ridge closure of the carton;
Figures 10 and 11 show a hand-held device for opening the carton using a shearing action;
Figure 12 illustrates the operation of a guide member to control the depth of severing;
Figure 13 illustrates an alternative form of guillotine cutter device with a retractable tongue guide;
Figures 14 to 18 illustrate two forms of hand-held devices for running along the ridge of a carton to effect the severing; (devices shown in figures 14 to 16 without the tongue guide according to the invention)
Figures 19 and 20 illustrate aspects of a wall mountable device with a rotary severing action; and
Figures 21 to 24 show the component part for assembling a preferred embodiment of a device.

**[0010]** A method of performing the invention will now be described with reference to Figures 1 to 7 of the drawings. Figures 1 to 7 illustrate the upper portion of a milk carton while having a body formed by a substantially square base, four side walls and a sealed folded flat top. Opposite side walls 2 are folded inward to permit the opposite side walls 3 to be inclined together to meet a ridge 4 which is folded flat and held in place by tongues 5 which are secured to the side walls 2. In such cartons the shorter walls 2 are folded inward although in the embodiment shown, the carton is of substantially square-cross section. The inclined portions 6 and 7 at the side walls 3 may be longer than the width of side walls 2 so that the top of the carton forms a gabled top.

**[0011]** To open the carton the tongues 5 are detached from the side walls 2 and the ridge 4 is lifted in the direction shown by the arrow 8 in Figure 1. The next step in opening the carton is shown in Figure 2. The shaded

portion 9 of the ridge 4 is removed from above the wings by severing the heat sealed closure segment along line 10 and folding or severing along the line 11. Then as shown in Figure 3, wings 12 and 13 are folded back by at least 90° onto the inclined portions 6 and 7 as generally instructed by the opening instructions and illustrations printed on the carton. The final step is to press inward in the direction of arrows 14 and 15 towards the ridge, as shown in Figure 4. This pressure springs the wings 12 and 13 open in the direction of the arrow 16. The top of the carton 1 is then in an open position as shown in Figures 5 and 6 illustrating the form of pouring lips 17 formed by the opened wings 12 and 13. The carton may be re-closed but not resealed by pushing the pouring tip in the direction of the ridge.

**[0012]** Referring now to Figure 7, the lines 10 and 11 along which the ridge 4 is severed or folded is shown in Figures 1 to 6 as orthogonal. However, the angle between the lines 10 and 11 is not critical and may be varied by increasing the angle by an additional angle 18. The angle of the lines 10 and 11 may lie between 45° and 150° although it is preferably limited to 60° so that the remaining part of the ridge 4 does not interfere with the opening of the wings 12 and 13. By selecting the angle 19 between the lines 10 and 11 the remaining part of the ridge can assist the re-closing of the carton by holding the wings 12 and 13 in a closed position.

**[0013]** Figures 8 and 9 show a form of cutter blade 20 comprising a section 21 for severing along the line 10 which is substantially parallel to the ridge 4, a section 22 for severing across the height of the ridge 4 along the line 11 which is orthogonal to the line 10, a section 23 which bears on the edge of the ridge to act as a guide to limit the length of the severed portion of the ridge 4 and a back plate 24 having a post 25 which is used to correctly locate and help to secure the cutter blade in a carton opening device. The cutting angle along the line 10 is shown by the angle 26 and the cutting angle along the line 11 is shown on Figure 8 by the angle 27. These angles are set to assist the cutting action and to reduce the force required to sever the portion 9 of the carton.

**[0014]** Figure 9 shows an alternative form of cutter blade in which the integers which perform the same function as those described with reference to Figure 8 are given the same reference numerals. It will be seen at the angles 26 and 27 in Figure 8 are reversed in the alternative form of blade. This reversal of the angles helps to maintain the ridge within the carton opening device whilst the severing is effected.

**[0015]** Referring now to Figures 10 and 11 which show a hand-held device basically comprising handles 28 and 29 joined by a link arm 30 which acts against a spring 31 to close jaws 32 and 33 which pivot about a post 34. The jaw 32 has an arcuate blade cutting edge 35 which co-operates with a corresponding edge 36 on the jaw 33. The edges 35 and 36 determine the lateral line of sever of the carton along the line 10 shown on Figure 10. The maximum length of cut 37 as shown on Figure 10 is determined by the length of the cutting edge 35, however, this is set by the positioning of a guide 38 which fits below the wings of the carton. The vertical line of sever of the carton along the line 11 shown on Figure 10 is determined by the edges 40 and 41. The maximum length of the cut 39 is determined by the length of upstanding edges 40 and 41 on jaws 32 and 33 respectively. The preferred depth of the cut 39 may be set as described later with reference to Figure 12.

**[0016]** In an alternative device not shown, the severing blade or blades may be replaced by a cut and pinch jaw assembly. The severing action provided by such a device is suited to a static surface-mounted or wall-mounted device.

**[0017]** If the ridge 4 (shown in Figures 1 to 6) is to be severed across its entire height instead of being folded back, the depth of severing must extend from the top edge of the ridge 4 to the root of the ridge so as to remove the sealed closed portion of the ridge. This depth may be controlled by a stop 50 which rests on the top edge of the ridge 4 as shown in Figure 12. The positioning of the carton opening device is assisted by the tongue guide 38, which holds the severing blade parallel to the ridge so that the carton is severed below the level at which the carton ridge is sealed.

**[0018]** Figure 13 shows a further form of device for severing a portion of the ridge of a carton. In particular the device includes a retractable guide 73 pivoted about a pin 74 so that a leg 75 of the guide fits under the wings of the carton and is retracted to a clamp and guillotine assembly 76 in position after it has been located on the top of the ridge 4. This ensures that the lateral line 10 is accurately aligned to sever the carton along the ridge line of the carton. The device has a handle 77 which is moved against the return action of a spring not shown to cause the cutter blade 64 located on post 78 on handle 77 to co-operate with a fixed cutter guillotine blade to sever the ridge 4. The ridge 4 is positioned by a spring steel pressure plate 79 mounted on a back plate 80 and the guide 73. The guide 73 has a keeper pin 81 which is depressed by the initial movement of the handle 77 causing the contact of a chamfered ramp 82 on the handle. The guide 73 is sprung to return to the open position. The pressure plate 79 bears against a post 78 on the cutter blade 64 to maintain contact pressure on the cutting edge.

**[0019]** It will be appreciated that the severing of the ridge of the carton may be effected by shearing members, snipping members, guillotine members or cutting members. The device may be hand-held or mounted on a fixed surface such as a wall or work surface.

**[0020]** A simple form of device is shown in Figures 14 to 18. A first form of device illustrated in Figures 14 to 16 does not belong to the invention. The severing is achieved by a fine cutting wheel 83 mounted at a foot of a side limb 84 of a U-shaped channel 85. A cross guide 86 is secured between side limb 87 and the side limb

84. An end stop 88 terminates a channel 85. A tongue guide is missing.

**[0021]** In use the channel 85 is pushed along the ridge of a carton. The guide 86 holds the ridge against the wheel 83 which severs the ridge along the line 10 (shown in Figure 2). The length of cut performed by the wheel 83 is limited to the line 11 (shown in Figure 2) by the end of the carton ridge bearing against the end stop 88. The device is then withdrawn from the carton and the severed portion of the ridge folded back to free the wings for opening in a normal way.

**[0022]** As shown in Figures 17 and 18 the cutting wheel 83 and the guide 86 may be replaced by a single or a post pair of blades 89 and 90 acting in co-operation with a tongue guide 38 which locates between the wings below the ridge as described with reference to Figure 10. The severing action may be linear or rotary. As shown in Figures 19 and 20 a work surface or wall-mounted rotary device includes a first severing blade 91 for effecting the cut along the line 10 (shown in Figure 2), the second severing blade 92 for effecting the cut along the line 11 (shown in Figure 2). The severing blades 91 and 92 are mounted in a housing 93 having a tongue 94 to locate under the gabled ridge and to limit the length of ridge that is severed. It will be appreciated that as the cartons are substantially square the wings project halfway into the ridge from both sides. Therefore the limitation for severing is substantially halfway along the ridge. The blades are rotated within the housing 93 by a wheel 95 or an electric motor. The device is mounted on a wall or supported on a work surface by brackets 96.

**[0023]** Figures 21 to 24 show a preferred embodiment of the invention. The carton opening device shown in its component parts in Figures 21 to 24 includes means for lifting the ridge of flat top cartons, a shrouded blade for safety, hinge means for providing a mechanical advantage to assist the severing action and cleaning ports to prevent a build-up of waste material within the shrouded cavity of the device. The device is suitable for opening gabled cartons and brick type cartons such as those marketed as "COMBIBLOC".

**[0024]** The device is formed as a two part plastics moulding with a thin surgical steel blade secured in an operating handle. Figure 21 shows an operating handle 97 with a recessed area 98 to receive the thin severing blade (not shown). The end of the handle 97 is provided with a slot for lifting the ridge of flat top cartons. Four pivot pins 99 are moulded into an annular hinge 100 at the boss end of the handle 97. Figures 22 and 23 show the two parts 101 and 102 of the housing which are secured together about the handle 97. Figure 22 shows the upper part 101 of the housing. The part 101 consists of a handle portion 103 and a head portion 104. The head portion 104 is recessed to permit unrestricted passage of the blade across a slot 105. The outer walls of the head portion 104 have ports 106 and 107 to permit the removal of waste material which may become lodged within the recessed portion 104 of the device.

**[0025]** Figure 23 shows the co-operating part of the two part housing. The outline shape is substantially identical with the part shown in Figure 22, so that locating pegs on one part co-operate with corresponding blind holes in the other part to accurately position the two parts of the housing about the annular hinge 100. A bifurcated tongue 108 projects from the underside of the part of the housing shown in Figure 23. The slot 105 is aligned with the slot in the tongue so that the carton ridge may be inserted into the slot 105 with the tongue 108 located below the ridge and between the wings of the carton.

**[0026]** A cross sectional view through an assembled device is shown in Figure 24. As shown in Figure 24 a blade 109 secured to the handle 97 moves about the annular hinge 100 within the recessed upper part 101 of the housing.

**[0027]** In use, the tongue 108 is positioned between the wings of a carton and the ridge is pushed fully into the slot 105. The length of the slot 105 ensures that the ridge is severed below the sealed closure for half the width of the ridge. A force is then applied between the handles 97 and 103 so that the blade 109 progressively severs the ridge along the line 10 (shown on Figure 2). At the end of the cut the device is withdrawn from the carton and the severed portion of the ridge is folded back to free the wings so that the carton may be opened by applying pressure to the wings (as shown in Figure 4).

**[0028]** Preferably the device is made from a plastics acetal copolymer material available from Hoescht under trade name "HOSTAFORM". Suitable blades are available from Swann Morton Limited of Sheffield. It will be appreciated that if the two part housing is made so that it may be dismantled, the blade may be replaced when worn. As the device provides a single cut action there is no requirement for a return spring, however, a return spring arrangement may be readily incorporated.

**[0029]** Referring to Figures 21 to 24 an additional bifurcated tongue may be provided on the upper part 101 of the housing to form a mirror image of the tongue 108 on the lower part 102. As the blade is substantially symmetrically positioned in the housing such a device can be used equally well by left-handed and right-handed people.

## Claims

1. A carton opening device for opening cartons of a kind having a ridge top with a winged sealed ridge closure, said device comprising

   an elongate slot (105) for receiving the winged sealed closure of said carton,
   severing means (109) for severing a portion of said sealed closure at one end thereof along at least a first plane, and

limiting means (88) for limiting the length along said first plane that the sealed closure is severed,
characterised in that there are provided guide means (38, 75, 94, 108) of elongate form spaced from said first plane and extending in the direction of elongation of said guide slot and for engagement beneath said ridge at said one end to be severed to locate said device as severing takes place.

2. A device as claimed in claim 1, characterised in that said guide means is a bifurcated tongue (108) which projects from the underside of the device in substantially parallel disposition to said first plane.

3. A device according to any of claims 1 to 2, characterised in that said first severing means is a shearing means, guillotine means or snipping means.

4. A device according to any of claims 1, 2 or 3, characterised in that said device includes a depth of cut stop (50) for bearing on the sealed closure during severing.

5. A device according to any of claims 1 to 4, characterised in that said device includes two guide means symmetrically positioned on opposite sides of the device.

6. A device according to any of claims 1 to 5, characterised in that said device is driven by a motor.

7. A device according to claim 1, characterised in that said severing means includes a first cutter (20) for severing along said first plane and a second cutter (22) for severing said sealed closure along a second plane meeting the first plane substantially in the middle of the length of the sealed closure and at an angle of between 45 degrees and 150 degrees..

8. A device according to claim 1, characterised in that said severing means comprises a thin cutting blade or blades (89, 90).

9. A device according to claim 1, characterised in that the guide means (75) is pivotable between an open position for reception of the ridge and a closed position for clamping the device on the carton.

**Patentansprüche**

1. Gerät zum Öffnen von Kartons, die ein Rippenoberteil mit einem geflügelten, abgedichteten Rippenverschluß aufweisen, umfassend

einen länglichen Schlitz (105) zum Aufnehmen des geflügelten, abgedichteten Rippenverschlusses des Kartons,
ein Trennmittel (109) zum Abtrennen eines Teils des abgedichteten Verschlusses an einem Ende des Verschlusses entlang mindestens einer ersten Fläche und
ein Begrenzungsmittel (88) zum Begrenzen der Länge entlang der ersten Fläche entlang der der abgedichtete Verschluß getrennt wird,
dadurch gekennzeichnet, daß ein Führungsmittel (38, 75, 94, 108) vorgesehen ist, das eine längliche Form aufweist, in einem Abstand zu der ersten Fläche angeordnet ist, sich in der Richtung der Längserstreckung des Führungsschlitzes erstreckt und zum Eingriff unter der Rippe an dem zu trennenden Ende vorgesehen ist, um das Gerät beim Abtrennen zu fixieren.

2. Gerät nach Anspruch 1, dadurch gekennzeichnet, daß das Führungsmittel eine gegabelte Zunge (108) ist, die sich an der Unterseite des Geräts in einer im wesentlichen zu der ersten Fläche parallelen Anordnung erstreckt.

3. Gerät nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das erste Trennmittel ein Mittel zum Scherenschneiden, Parallelschneiden oder Schnipselschneiden ist.

4. Gerät nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß das Gerät einen Schneidtiefenanschlag (50) zum Abstützen auf dem abgedichteten Verschluß während des Trennens aufweist.

5. Gerät nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das Gerät zwei Führungsmittel aufweist, die auf gegenüberliegenden Seiten des Geräts symmetrisch angeordnet sind.

6. Gerät nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß das Gerät durch einen Motor angetrieben wird.

7. Gerät nach Anspruch 1, dadurch gekennzeichnet, daß das Trennmittel ein erstes Schneidwerkzeug (21) zum Trennen entlang der ersten Fläche und ein zweites Schneidwerkzeug (22) zum Trennen des abgedichteten Verschlusses entlang einer zweiten Fläche, die die erste Fläche im wesentlichen in der Mitte der Länge des abgedichteten Verschlusses und in einem Winkel zwischen 45° und 150° schneidet, aufweist.

8. Gerät nach Anspruch 1, dadurch gekennzeichnet, daß das Trennmittel ein Schneidmesser oder Schneidklingen (89, 90) umfaßt.

9. Gerät nach Anspruch 1, dadurch gekennzeichnet,

daß das Führungsmittel (75) zwischen einer offenen Stellung zum Aufnehmen der Rippe und einer geschlossenen Stellung zum Festklemmen des Geräts an dem Karton verschwenkbar ist.

**Revendications**

1. Dispositif d'ouverture de cartons pour ouvrir des cartons d'un genre ayant un dessus à crête comportant une fermeture en forme d'aile étanche à crête, le dispositif comportant :

   une fente (105) oblongue pour recevoir la fermeture étanche ailée du carton
   des moyens (109) de séparation pour séparer une partie de la fermeture étanche à une de ses extrémités suivant au moins un premier plan, et
   des moyens (88) limitant pour limiter la longueur suivant le premier plan sur laquelle la fermeture étanche est séparée,
   caractérisé en ce que
   sont prévus des moyens (38, 75, 94, 108) de guidage de forme oblongue à distance du premier plan et s'étendant dans la direction de l'élongation de la fente de guidage et destinés à coopérer au-dessous de la crête à l'extrémité à séparer pour placer le dispositif lorsque la séparation a lieu.

2. Dispositif suivant la revendication 1, caractérisé en ce que les moyens de guidage sont une languette (108) à fourche qui fait saillie du côté inférieur du dispositif suivant une disposition sensiblement parallèle au premier plan.

3. Dispositif suivant l'une quelconque des revendications 1 à 2, caractérisé en ce que les premiers moyens de séparation sont des moyens de cisaillement, des moyens à guillotine ou des moyens coupeurs.

4. Dispositif suivant l'une quelconque des revendications 1, 2 ou 3, caractérisé en ce que le dispositif a une profondeur de butée (50) de découpe destinée à porter sur la fermeture étanche pendant la séparation.

5. Dispositif suivant l'une quelconque des revendications 1 à 4, caractérisé en ce que le dispositif comporte deux moyens de guidage positionnés symétriquement sur des côtés opposés du dispositif.

6. Dispositif suivant l'une quelconque des revendications 1 à 5, caractérisé en ce que le dispositif est entraîné par un moteur.

7. Dispositif suivant la revendication 1, caractérisé en ce que les moyens de séparation comporte un premier couteau (20) pour séparer suivant le premier plan et un second couteau (22) pour séparer la fermeture étanche suivant un second plan rencontrant le premier plan sensiblement au milieu de la longueur de la fermeture étanche et à un angle compris entre 45° et 150°.

8. Dispositif suivant la revendication 1, caractérisé en ce que les moyens de séparation comporte une ou des lame(s) (89, 90) de découpe mince(s).

9. Dispositif suivant la revendication 1, caractérisé en ce que les moyens (75) de guidage peut pivoter entre une position ouverte pour recevoir la crête et une position fermée pour serrer le dispositif sur le carton.

FIG. 1

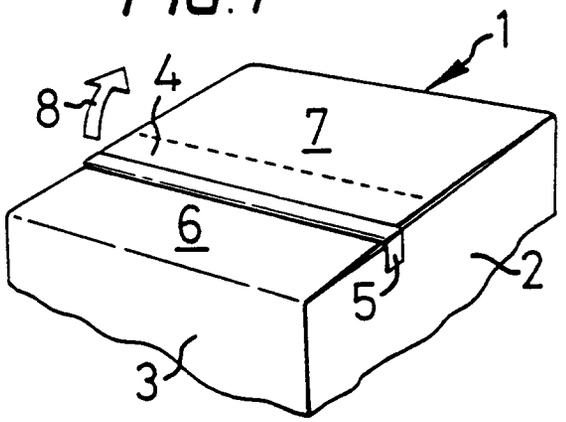



FIG. 2

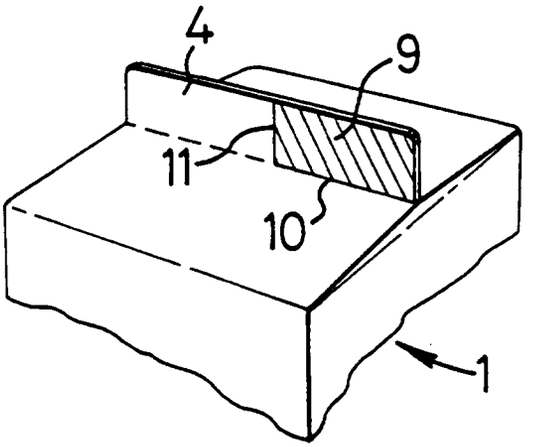



FIG. 3

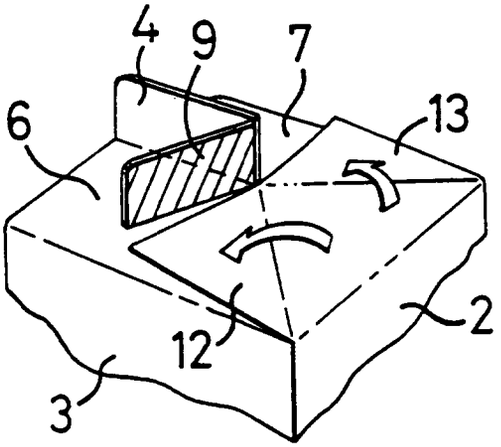



FIG. 4

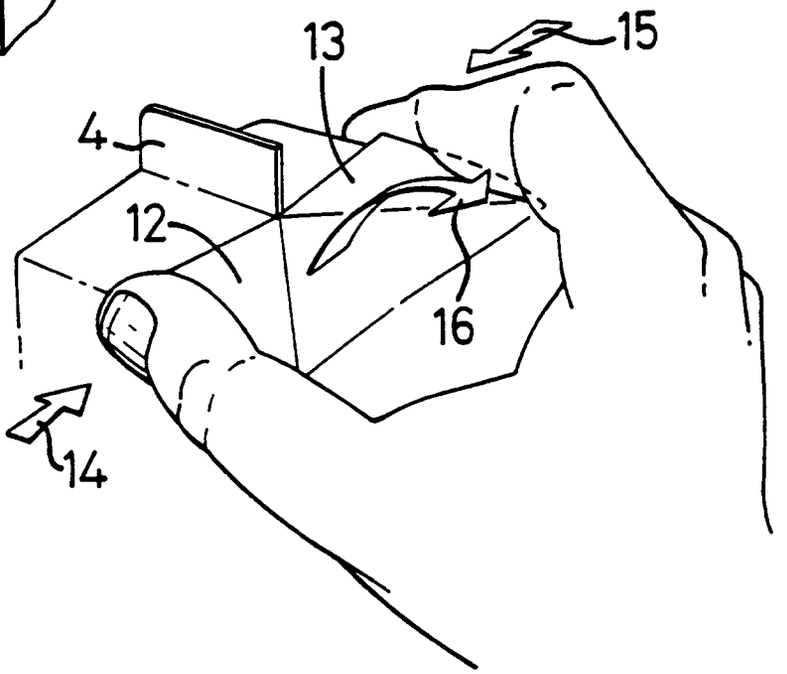


FIG.5

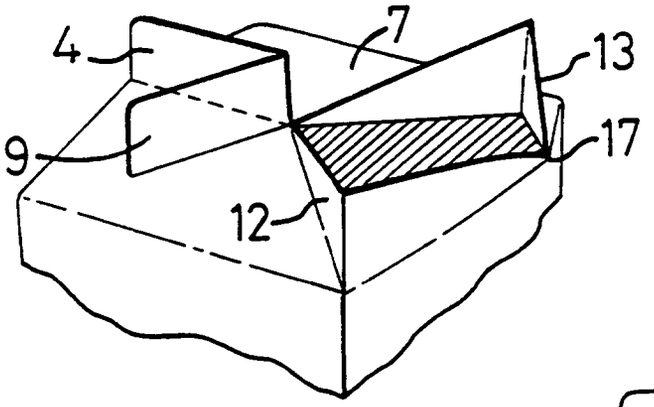



FIG.6

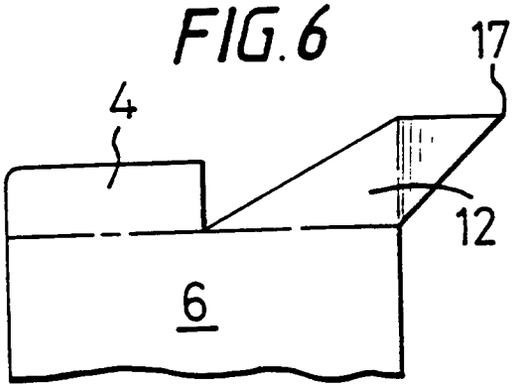



FIG.7

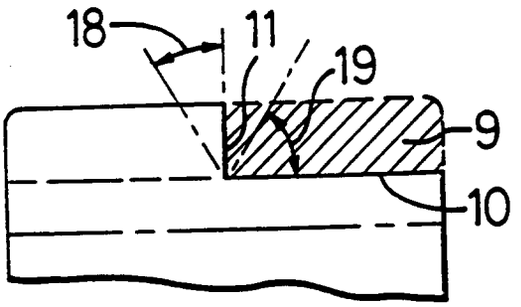



FIG.8

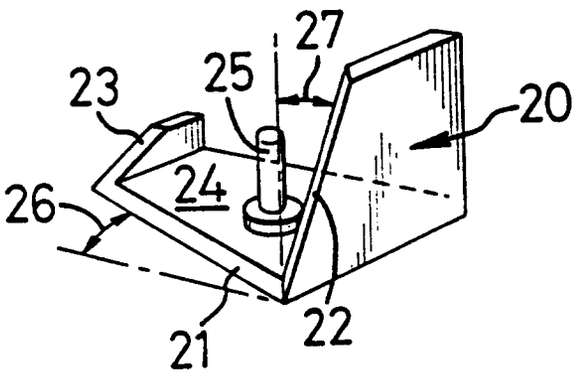



FIG.9

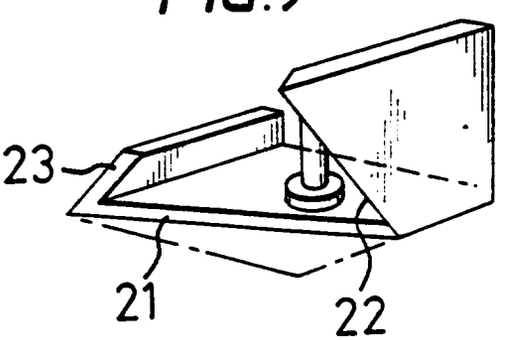


FIG. 10

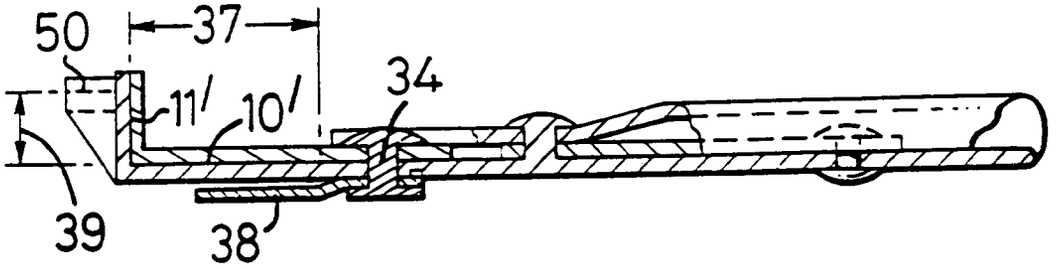



FIG. 11

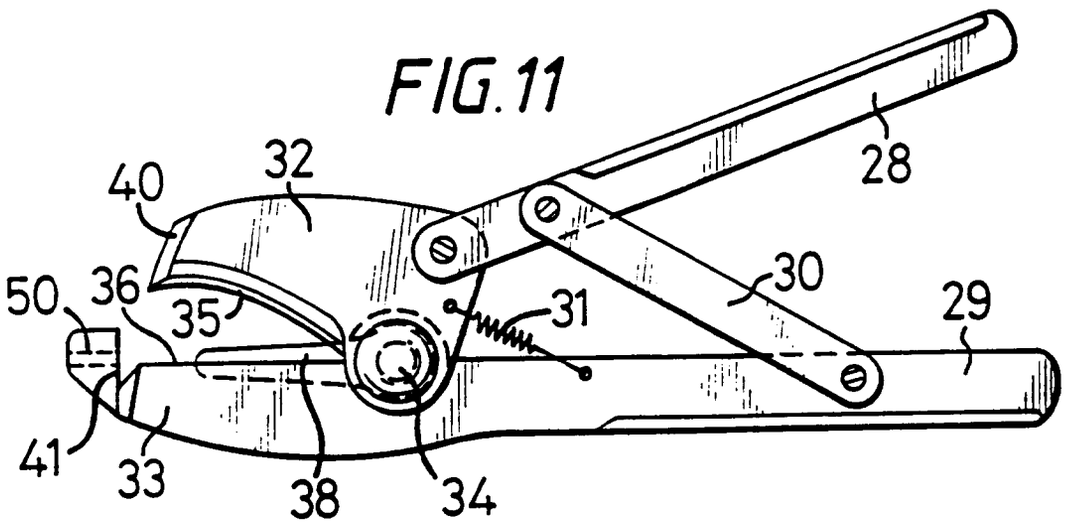



FIG. 12

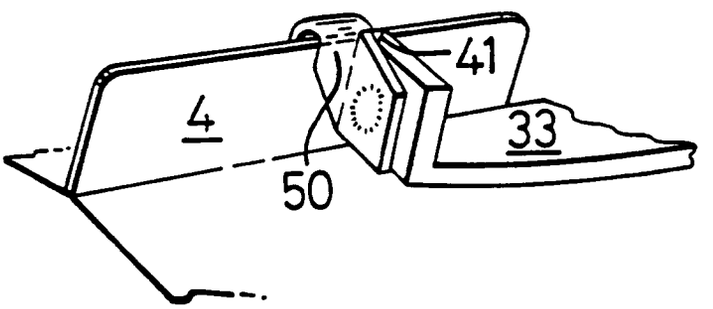



FIG. 13

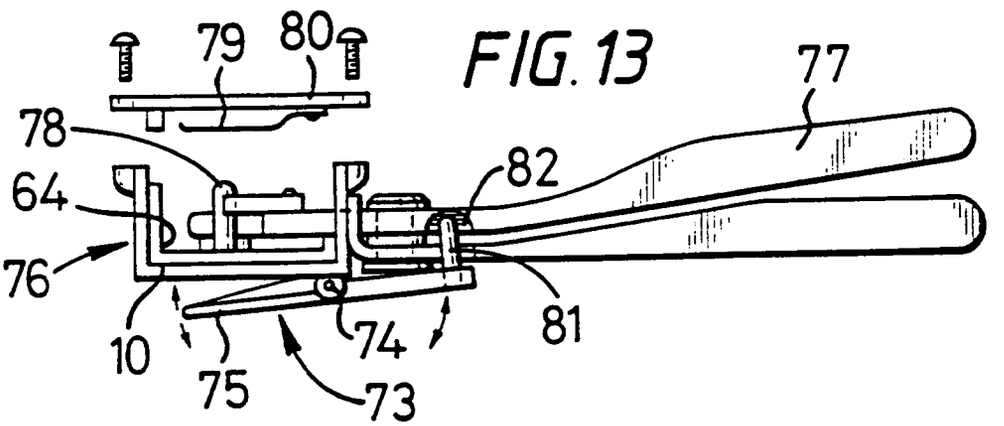


FIG. 14

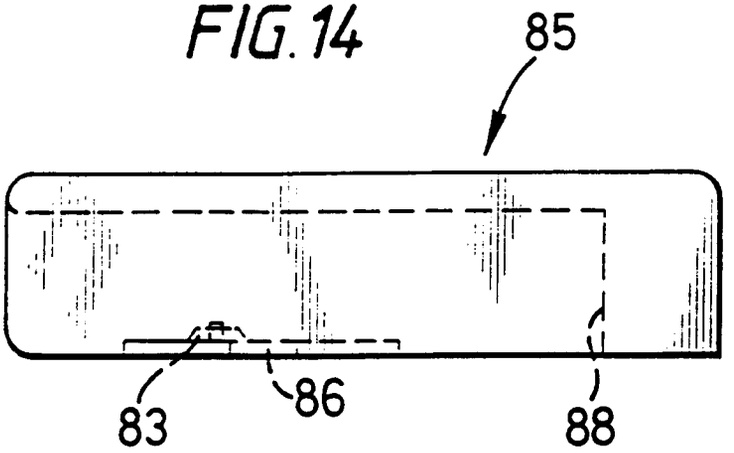



FIG. 15

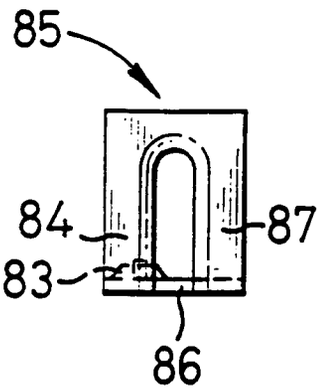
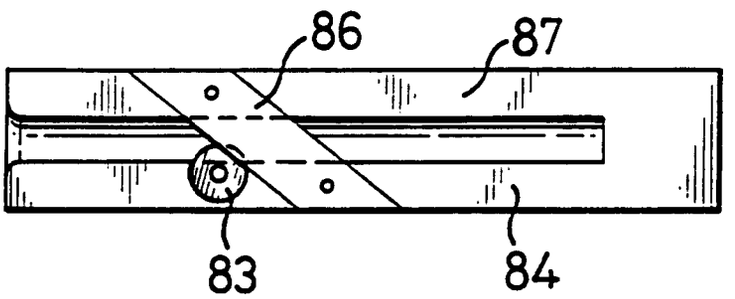



FIG. 16




carton opening device according to figures 14 to 16 similar to the invention but without a guide tongue

FIG. 17

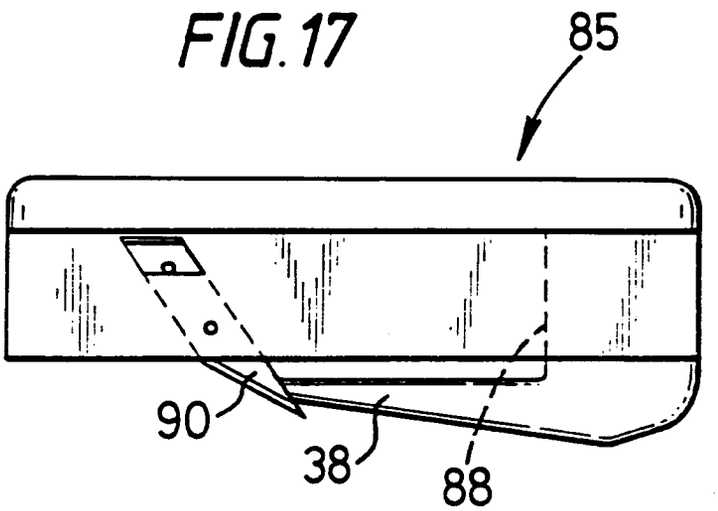



FIG. 18

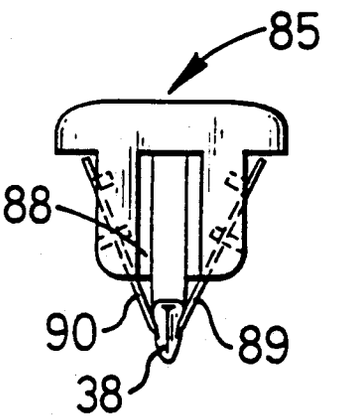


FIG. 19

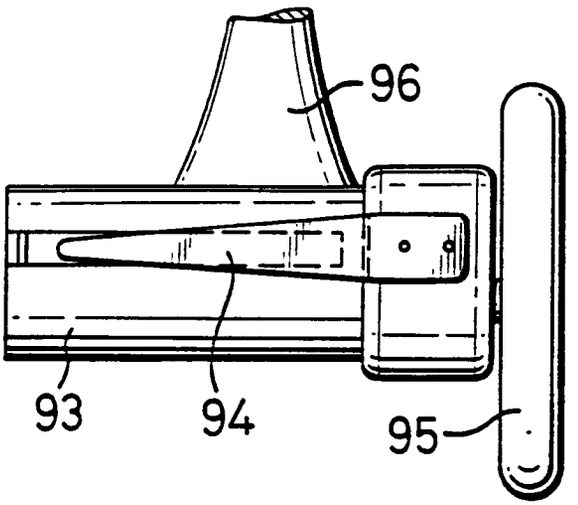



FIG. 20

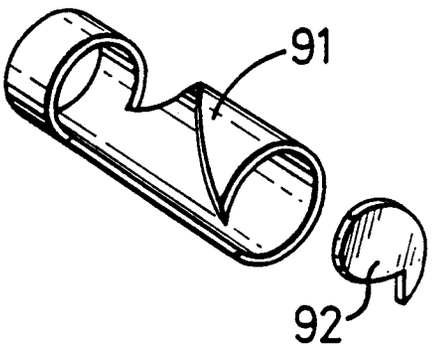
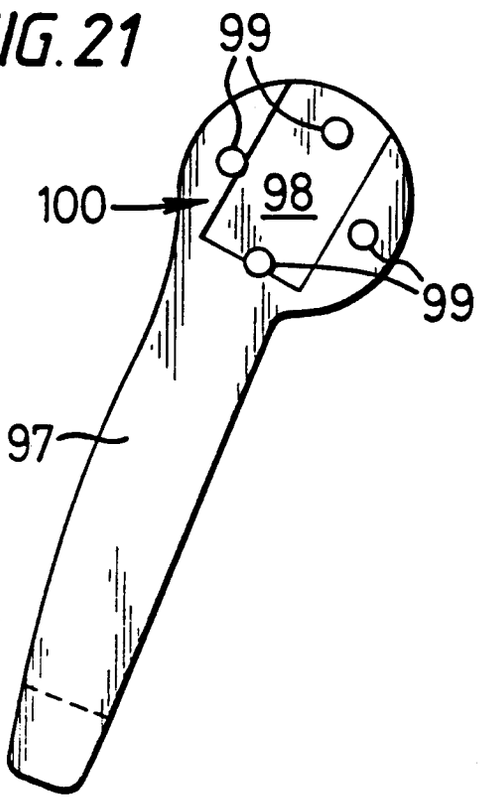



FIG. 21



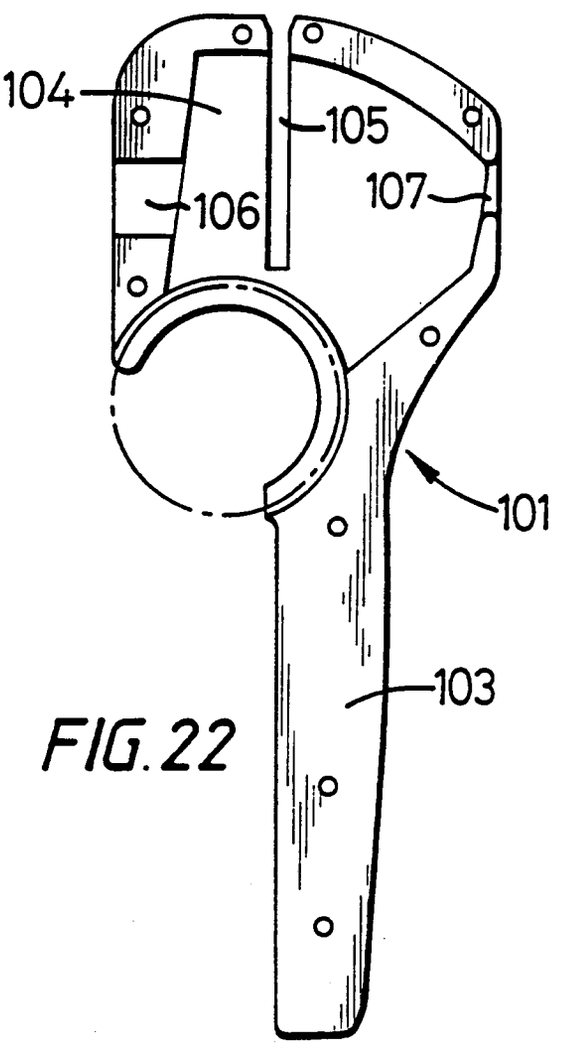




FIG. 22

FIG. 23

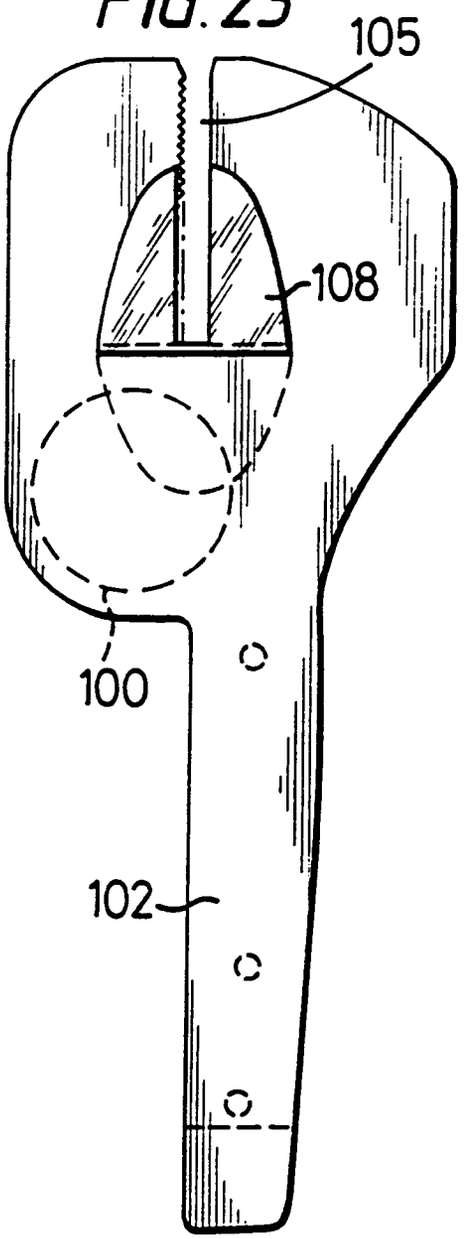



FIG. 24