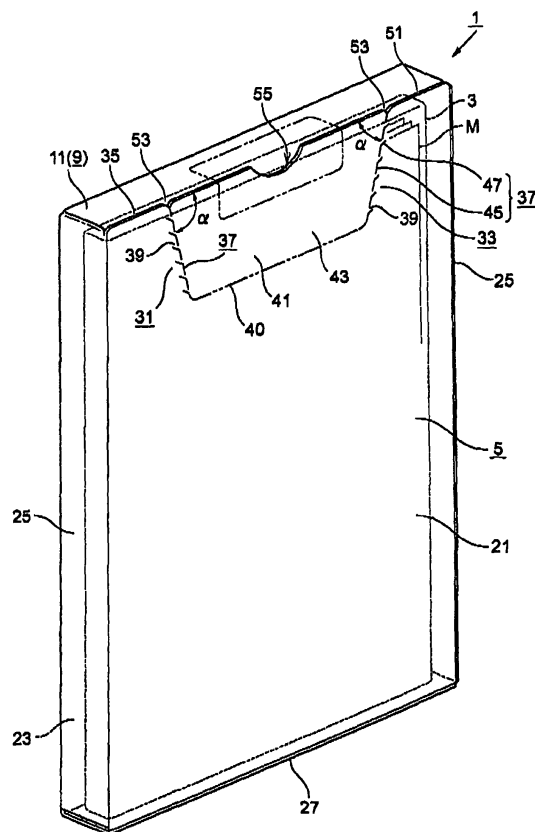




Description

Technical Field

[0001] The present invention relates to a packing box suitable for a packing photosensitive recording material such as an X-ray film and, more specifically, a packing box for photosensitive recording material in which an opening port can be formed adjacently to an output port for facilitating the photosensitive recording material to be taken out from the output port.

Background Art

[0002] In order to facilitate the photosensitive recording material such as the X-ray film to be taken out from the packing box, there is a type in which an opening port 103 can be formed adjacently to an output port 101 as shown in Fig. 6A and Fig. 6B in the related art.

[0003] The type shown in Fig. 6A is formed with a lateral zipper 105 in parallel with the output port 101 at a position about 10 cm from the output port 101 and, when in use, the lateral zipper 105 is torn and then an opening strip 107 is pulled upward from below to enable the opening port 103 to be opened (see JP-A-8-114889).

[0004] The type shown in Fig. 6B is formed with perforated lines 111 respectively at both ends of an upper portion of a front panel 109 which is adjacent to the output port 101 in the direction vertical to the output port 101 and, when in use, an opening tape 113 is torn first, and then the opening strip 107 is pulled downward from the top to enable the opening port 103 to be opened.

[0005] However, in the case of the former type, since the lateral zipper 105 is long, the large amount of paper powder is generated. When a light-shielding moisture proof bag for storing the photosensitive recording material is electrically charged, the generated paper powder is attached thereto, and is carried into a tray of an imager. When the paper powder is attached to an unexposed film when being mounted to a daylight room, a defect called "blank" may be resulted.

[0006] In the case of the latter type, since the perforated lines 111 also serve as bending lines, if the length of portions to be broken of the perforated lines 111 is too short, the perforated lines may be broken when forming a box or the compression strength is lowered. In contrast, if the length of portions to be broken of the perforated lines 111 is too long, a large opening force is required. In particular, in the case of a wide box, since the distance between the perforated lines 111 is large, it may not be opened successfully unless it is opened in parallel with the perforated lines 111 using both hands.

Disclosure of the Invention

[0007] In view of above-described problems of the packing box in the related art, it is an object of the invention to provide a packing box for photosensitive recording

material in which an opening port can be formed easily by pulling an opening strip with one hand and the amount of generation of paper powder at this time is small.

[0008] After having repeated keen examination, the inventors found that the above-described problem can be solved according to the packing box for photosensitive recording material in the invention having a configuration shown below.

[0009] A packing box for photosensitive recording material according to the invention includes a box body of a rectangular shape in cross-section for storing a photosensitive recording material, and a lid portion having a lid top plate and an insertion flap for enabling opening and closing of an output port for the photosensitive recording material and being formed integrally with the box body, wherein two perforated lines including cut portions and non-cut portions arranged alternately are formed from two points at a distance of 50 to 75% of an entire width of the output port toward a bottom portion of the box body so as to approach toward each other at the same angle between 60° and 90°, preferably, between 70° and 80° with respect to an upper side of a front panel on the side of the output port of the front panel of the box body to which the insertion flap comes adjacent when the lid portion is closed, wherein an area surrounded by the two perforated lines and lines connecting between upper ends and between lower ends of the respective perforated lines constitutes a substantially trapezoidal opening strip for forming an opening port for facilitating the photosensitive recording material to be taken out from the output port when the respective perforated lines are broken, wherein the cut portions of the perforated line each include a main line extending in a breaking direction and an introduction line formed so as to open at a starting side of the respective cut portions outward from the breaking direction, and wherein the respective cut portions are arranged such that when an imaginary line vertical to the upper side of the front panel is drawn from a terminal of the main line to the cut portion located immediately below, the imaginary line passes through a center area of the introduction line out of three equally divided parts of the cut portion immediately below (first mode).

[0010] In the invention shown above, the packing box for photosensitive recording material is formed of a corrugated board (second mode).

[0011] In the invention described above, flutes of the corrugated board are formed in parallel with the upper side of the front panel, and the positions of the corresponding cut portions of the two perforated lines may be shifted in the vertical direction toward the upper side of the front panel by an amount corresponding to one third to two third, more preferably, a half a pitch of the flutes of the corrugated board (third mode).

[0012] In the invention described above, the length of the non-cut portion of the respective perforated lines may be reduced on the side closer to an upper side of the output port and increased on the side closer to a bottom portion thereof (fourth mode).

[0013] In the invention described above, beginning ends of the two perforated lines located on the upper side of the front panel are rounded sides thereof (fifth mode).

[0014] In the invention described above, the upper side of the front panel is cut into fine waveforms (sixth mode)

[0015] In the invention described above, lines are tooled from a surface opposite from a printed surface of the packing box for photosensitive recording material and the box is formed by valley bending the lines (seventh mode).

[0016] According to the first mode, since a sufficient force for breaking the non-cut portions of the perforated lines is efficiently applied to the two perforated lines only by pinching a point at a center of the opening strip and pulling the same downward with fingers, the two perforated lines can be broken easily with one hand. Since the total length of the two perforated lines is relatively short, the amount of generation of paper powder at the time of breakage can be suppressed.

[0017] According to the second mode, the packing box for photosensitive recording material superior in strength and light-shielding property can be provided.

[0018] According to the third mode, since the portions which can easily be broken and the portions which can hardly be broken of the two perforated lines on the corrugated board are broken in the equalized manner, variations in an opening force can be reduced.

[0019] According to the fourth mode, since the length of the non-cut portion of the respective perforated lines is short on the side closer to the output port and long on the side closer to the bottom portion, the perforated lines which can be cut easily at the beginning of cutting, and can be cut straight to the end when it is started to be cut once are realized.

[0020] According to the fifth mode, an operator is prevented from being injured on his/her hand by a pointed edge when he/she opens the opening strip.

[0021] According to the sixth mode, the operator is prevented from being injured on his/her hand by a cut edge of the corrugated board.

[0022] According to the seventh mode, variation in box dimension and abnormalities such as clog of products or faulty insertion of the insertion flap in an automatic filling machine can be prevented when forming the packing box by bending along the lines.

Brief Description of Drawings

[0023]

Fig. 1 is a perspective view showing an entire packing box for photosensitive recording material to which the invention is applied in the closed state.

Fig. 2A is an extension plan view of the packing box of a side opening type.

Fig. 2B is an extension plan view of the packing box of a vertically opening type.

Fig. 3A is an enlarged drawing of a periphery of an

opening strip in the closed state.

Fig. 3B is an enlarged drawing of the periphery of the opening strip in the opened state.

Fig. 4 illustrates enlarged drawings of a perforated line.

Fig. 5 is an explanatory drawing showing a state in which the left and right perforated lines are shifted in the vertical direction.

Fig. 6 is a plan view showing two packing boxes in the related art.

Detailed Description of the Invention

[0024] Referring now to the drawings, a packing box for photosensitive recording material according to the present invention will be described in detail.

[0025] Fig. 1 is a perspective view showing an entire packing box for photosensitive recording material (hereinafter referred to as packing box) to which the present invention is applied in the closed state; Fig. 2A is an extension plan view of the packing box of a side opening type and Fig. 2B is an extension plan view of the packing box of a vertically opening type; Fig. 3A is an enlarged drawing of a periphery of an opening strip in the closed state and Fig. 3B is an enlarged drawing of the periphery of the opening strip in the opened state; Figs. 4A and B illustrate enlarged drawings of a perforated line; and Fig. 5 is an explanatory drawing showing a state in which the left and right perforated lines are shifted in the vertical direction. In the following description, upper, lower, left and right of the packing box are based on a packing box 1 in Fig. 1.

[0026] The packing box 1 in the present invention mainly includes a box body 5 that accommodates a photosensitive recording material M tight-sealed in an inner bag 3 and has a rectangular shape in cross-section having a longitudinal side and a short side. The box body 5 is formed at an upper portion thereof with an output port 7 for the photosensitive recording material M in the opened state, and is closed by a lid portion 9 which can be opened and closed in the closed state. The lid portion 9 includes a lid top plate 11 and an insertion flap 13 continuing therefrom formed integrally with the box body 5. For example, the packing box 1 is formed by assembling an extension plan view 15 of a side opening type as showing Fig. 2A or an extension plan view 15 of a vertically opening type as shown in Fig. 2B. A chain line represents a valley fold line, a chain double-dashed line represents a mountain fold line, and a solid line in the extension plan view represents a breaking line in Fig. 2A and Fig. 2B. The packing box 1 is formed of micro-flute corrugated board such as E-flute (the number of corrugation is about 94/300 mm) or F-flute (the number of corrugation is about 120/300 mm), and the flutes extends in the direction designated by reference numeral 17 in Fig. 2A and Fig. 2B, that is, the flutes extends in parallel with an upper side of a front panel 21 described later, and the direction designated by reference numeral 19 corresponds to the di-

rection of paper grain of a liner.

[0027] As shown in Fig. 1, a plane of the box body 5 on the side where the insertion flap 13 comes adjacent thereto when the lid portion 9 is closed is a front panel 21, and a back panel 23 is provided so as to oppose the front panel 21. Side panels 25 are provided at both ends between the front panel 21 and the back panel 23, and a bottom panel 27 is provided at a bottom of the box body 5.

[0028] Two perforated lines 31, 33 are formed on the side of the output port 7 of the front panel 21 from two points at a distance of 50 to 75% of an entire width 29 of the output port 7 toward a bottom surface of the box body 5. The two perforated lines 31, 33 are formed at a slant so as to approach toward each other at the same angle α between 60° and 90° , preferably, between 70° and 80° with respect to an upper side 35 of the front panel 21. The angle in this embodiment employs 75° .

[0029] In this embodiment, the perforated lines 31, 33 each are configured by a combination of six sets of cut portions 37 and non-cut portions 39 arranged alternately. A substantially trapezoidal area surrounded by the two perforated lines 31, 33, the upper side 35 and a hinge 40 of the mountain fold constitute an opening strip 41, so that an opening port 43 is formed by opening the opening strip 41 when the respective perforated lines 31, 33 are broken thereby facilitating the photosensitive recording material M to be taken out from the output port 7. A notched portion 55 is formed at a center of the upper side 35 of the front panel 21 for facilitating a finger to hold the insertion flap 13 when opening the lid portion 9.

[0030] The cut portions 37 of the respective perforated lines 31, 33 each include a main line 45 extending in a breaching direction 44 shown in Figs. 4A, 4B and introduction lines 47 each formed so as to open at a starting side of the respective perforated lines 31, 33 (the side closer to the output port 7) outward from the breaching direction. The positional relation between the respective adjacent cut portions 37 is, as shown in Figs. 4A, 4B, such that when an imaginary line 59 vertical to the upper side 35 of the front panel 21 is drawn from a terminal (an end closer to the bottom panel 27) of the main line 45 of the cut portion 37 located on an upper side to the introduction line 47 immediately below, the vertical line passes through a center area 49 of the introduction line 47 out of three equally divided parts thereof.

[0031] The length of the non-cut portion 39 of the respective perforated lines 31, 33 (i.e. the length of the imaginary line 59) may be all the same as shown in Fig. 4A or may be such that the length of the non-cut portion 39 is reduced on the side closer to an upper side of the output port 7 and of a non-cut portion 39' is increased on the side closer to a bottom portion thereof as shown in Fig. 4B. For example, in a case in which six pairs of the cut portion 37 and the non-cut portion 39 are provided as in the embodiment shown in Fig. 4B, it is also possible to set the length of the three non-cut portions 39 located closer to the output port 7 to 3 mm, and the length of the

remaining non-cut portions 39' to 3.5 mm or, although not shown, to employ a configuration in which the length of the non-cut portions 39 is increased gradually in sequence from the side closer to the output port 7.

[0032] The operation to open the opening strip 41 is none other than the principle of leverage with the notched portion 55 as a power point, the hinge 40 as a supporting point, and the non-cut portion 39 as a working point. When it starts to open, since the working point is located immediately inside the power point, a force applied to the non-cut portion is not amplified. However, at the end of opening, the working point is moved to a point immediately outside the supporting point, and hence the non-cut portion 39 can be broken to the end easily only by applying a small force to the power point.

[0033] In the packing box 1, the insertion flap 13 is inserted under the three non-cut portions 39 on the side closer to the output port 7 in the unopened state, even when a load is applied to the front panel 21 in the vertical direction, or in the case in which the packing box 1 is roughly treated, the non-cut portions 39 of the perforated lines 31, 33 are prevented from being broken by mistake. Alternatively, even when the length of the remaining non-cut portions 39' is increased, the force required for the opening end portion is not increased. In this arrangement, the perforated line which can be easily cut at the beginning of cutting, can be cut straight to the end when it is stated to be cut once, and is strong is realized.

[0034] As shown in Fig. 5, the positions of the respective cut portions 37 of the two perforated lines 31, 33 are shifted in the vertical direction toward the upper side 35 of the front panel 21 by an amount corresponding to one third to two third, more preferably, a half a pitch 51 of the flutes of the corrugated board. In this configuration, the portions which can easily be broken and the portions which can hardly be broken of the two perforated lines 31, 33 on the corrugated board are broken in an equalized manner, so that variations in an opening force can be reduced.

[0035] Subsequently, the configuration of the portions around the perforated lines 31, 33 will be described. As shown in Fig. 3A, beginning ends 53 of the two perforated lines 31, 33 located on the upper side 35 of the front panel 21 are rounded on both sides thereof, so that an operator is prevented from being injured by a pointed edge when opening the opening strip 41. At least all the areas of the upper side 35 of the front panel 21 including the above-described notched portion 55 are cut into fine waveforms 57 as shown in Figs. 4A, 4B so as to prevent finger cut by a cut edge of the corrugated board.

[0036] The packing box 1 in the present invention, a back surface of a surface shown in the extension plan view 15 of Fig. 2A and Fig. 2B is a printed surface, and the lines shown by the chain line and the chain double-dashed line are tooled from the side opposite from the printed surface, that is, the side of the surface shown in the extension plan view 15. Accordingly, when forming the packing box by bending along the line, variations in

box dimension and abnormalities such as clog of products or faulty insertion of the insertion flap in an automatic filling machine can be prevented.

[0037] The packing box for photosensitive recording material according to the present invention can be utilized widely as a packing box for packing various types of the photosensitive recording materials. In particular, it can be preferably used as a packing box for an X-ray film such as medical film in which developing liquid is not used, such as a laser imager.

Claims

1. A packing box for photosensitive recording material comprising:

a box body of a rectangular shape in cross-section for storing a photosensitive recording material, and

a lid portion having a lid top plate and an insertion flap for enabling opening and closing of an output port for the photosensitive recording material and being formed integrally with the box body, wherein two perforated lines including cut portions and non-cut portions arranged alternately are formed from two points at a distance of 50 to 75% of an entire width of the output port toward a bottom portion of the box body so as to approach toward each other at the same angle between 60° and 90° with respect to an upper side of a front panel on the side of the output port of the front panel of the box body to which the insertion flap comes adjacent when the lid portion is closed,

wherein an area surrounded by the two perforated lines and lines connecting between upper ends and between lower ends of the respective perforated lines constitutes a substantially trapezoidal opening strip for forming an opening port for facilitating the photosensitive recording material to be taken out from the output port when the respective perforated lines are broken, wherein the cut portions of the perforated line each include a main line extending in a breaking direction and an introduction line formed so as to open at a starting side of the respective cut portions outward from the breaking direction, and wherein the respective cut portions are arranged such that when an imaginary line vertical to the upper side of the front panel is drawn from a terminal of the main line to the cut portion located immediately below, the imaginary line passes through a center area of the introduction line out of three equally divided parts of the cut portion immediately below.

2. The packing box for photosensitive recording mate-

rial according to Claim 1, wherein the packing box for photosensitive recording material is formed of a corrugated board.

3. The packing box for photosensitive recording material according to Claim 2, wherein flutes of the corrugated board are formed in parallel with the upper side of the front panel, and the positions of the corresponding cut portions of the two perforated lines are shifted in the vertical direction toward the upper side of the front panel by a distance corresponding to one third to two third of a pitch of the flutes of the corrugated board.

4. The packing box for photosensitive recording material according to any one of Claims 1 to 3, wherein the length of the non-cut portion of the respective perforated lines is reduced on the side closer to an upper side of the output port and increased on the side closer to a bottom portion thereof.

5. The packing box for photosensitive recording material according to any one of Claims 1 to 4, wherein beginning ends of the two perforated lines located on the upper side of the front panel are rounded thereof.

6. The packing box for photosensitive recording material according to any one of Claims 1 to 5, wherein at least the upper side of the front panel is cut into fine waveforms.

7. The packing box for photosensitive recording material according to any one of Claims 1 to 6, wherein lines are tooled from a surface opposite from a printed surface of the packing box for photosensitive recording material and the box is formed by valley bending the lines.

Fig.1

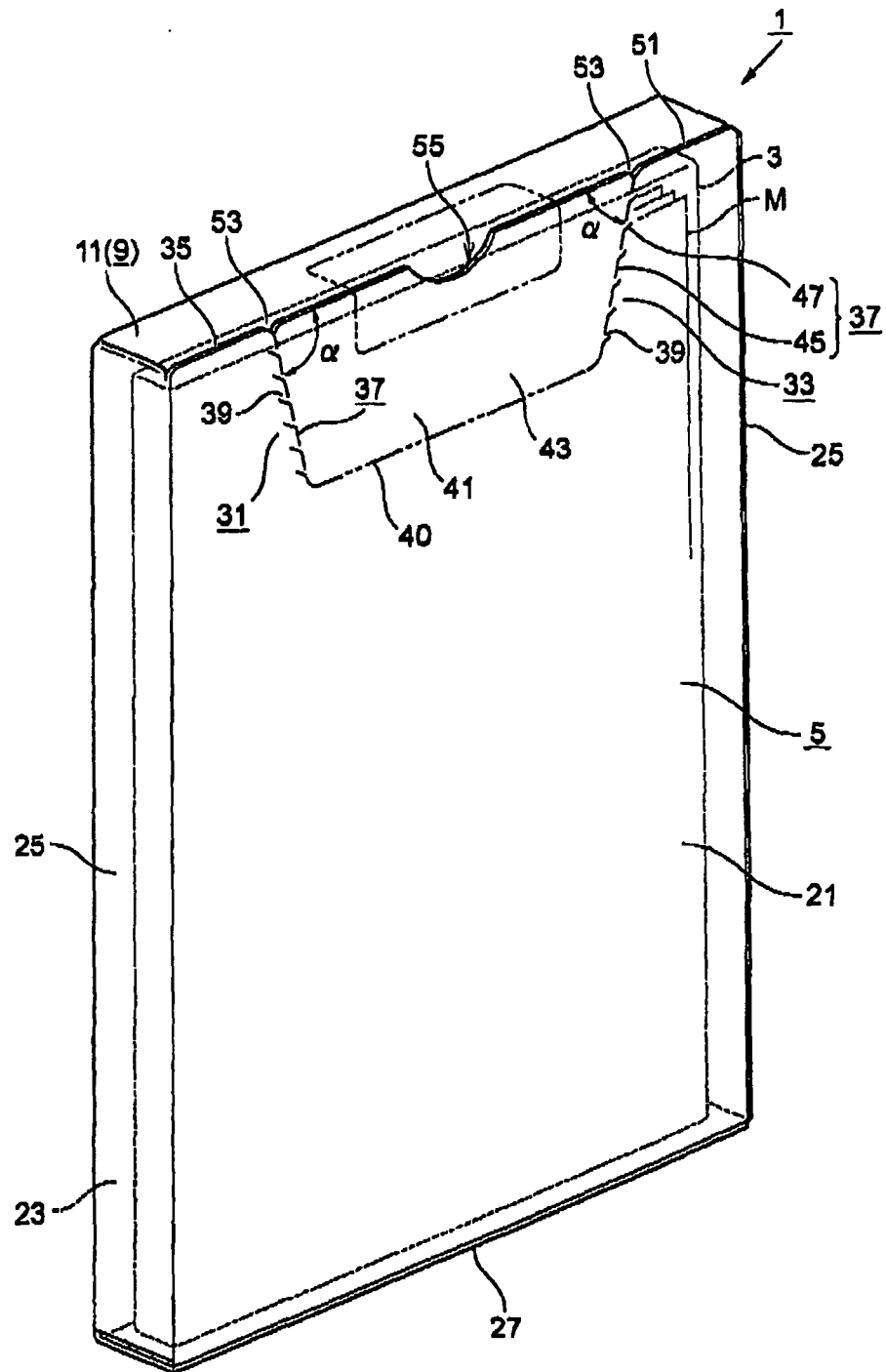


Fig.2 (a)

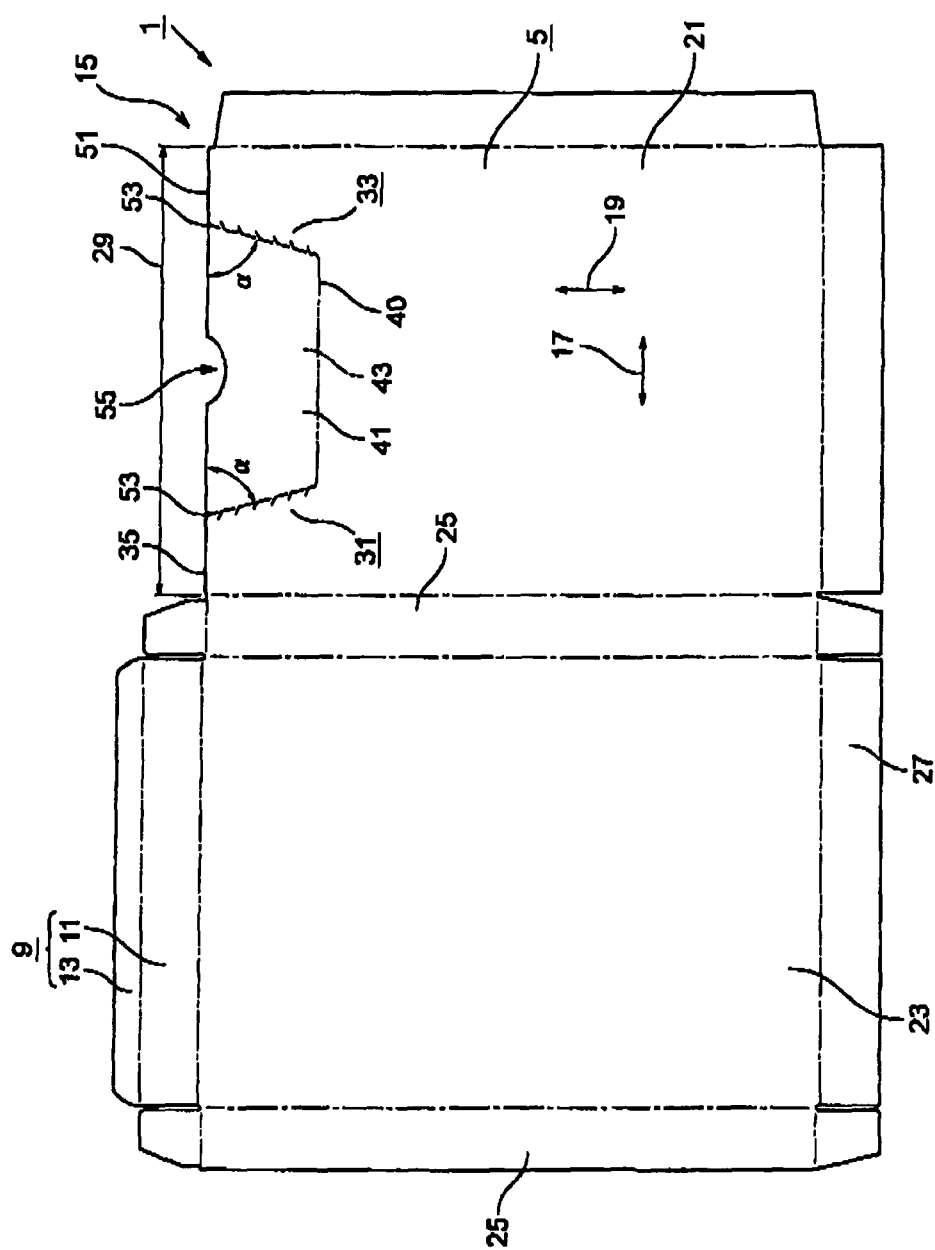


Fig.2 (b)

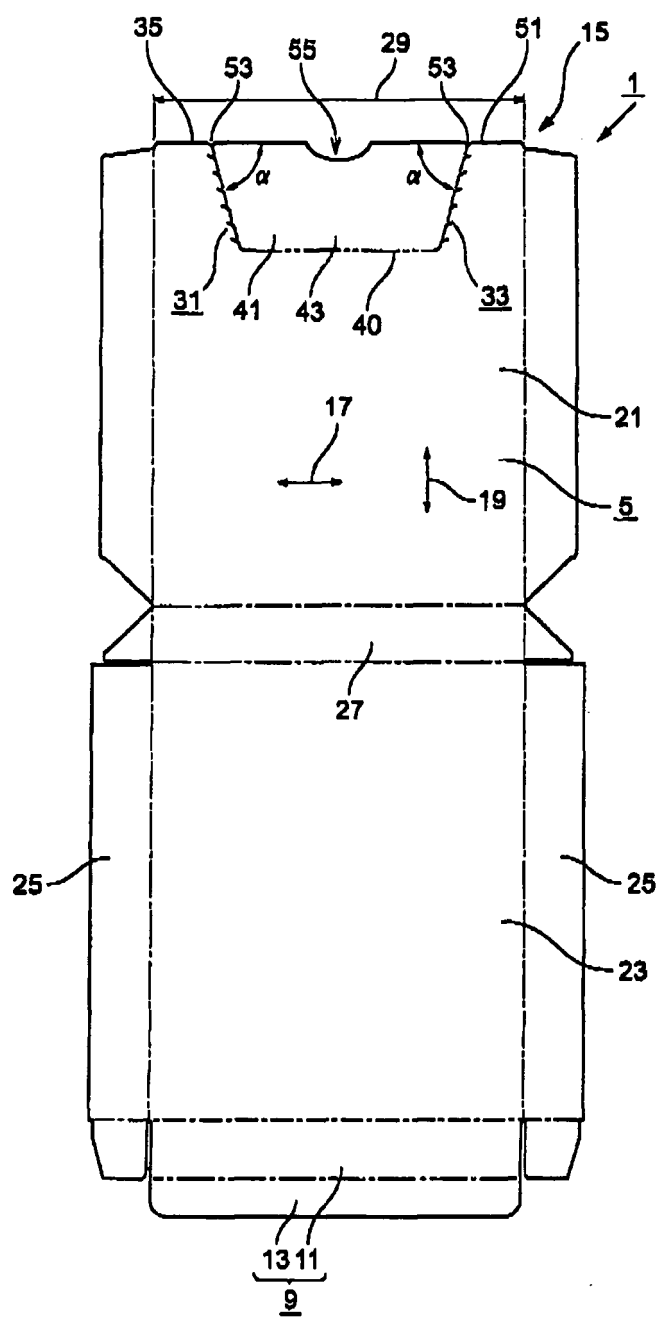


Fig. 3

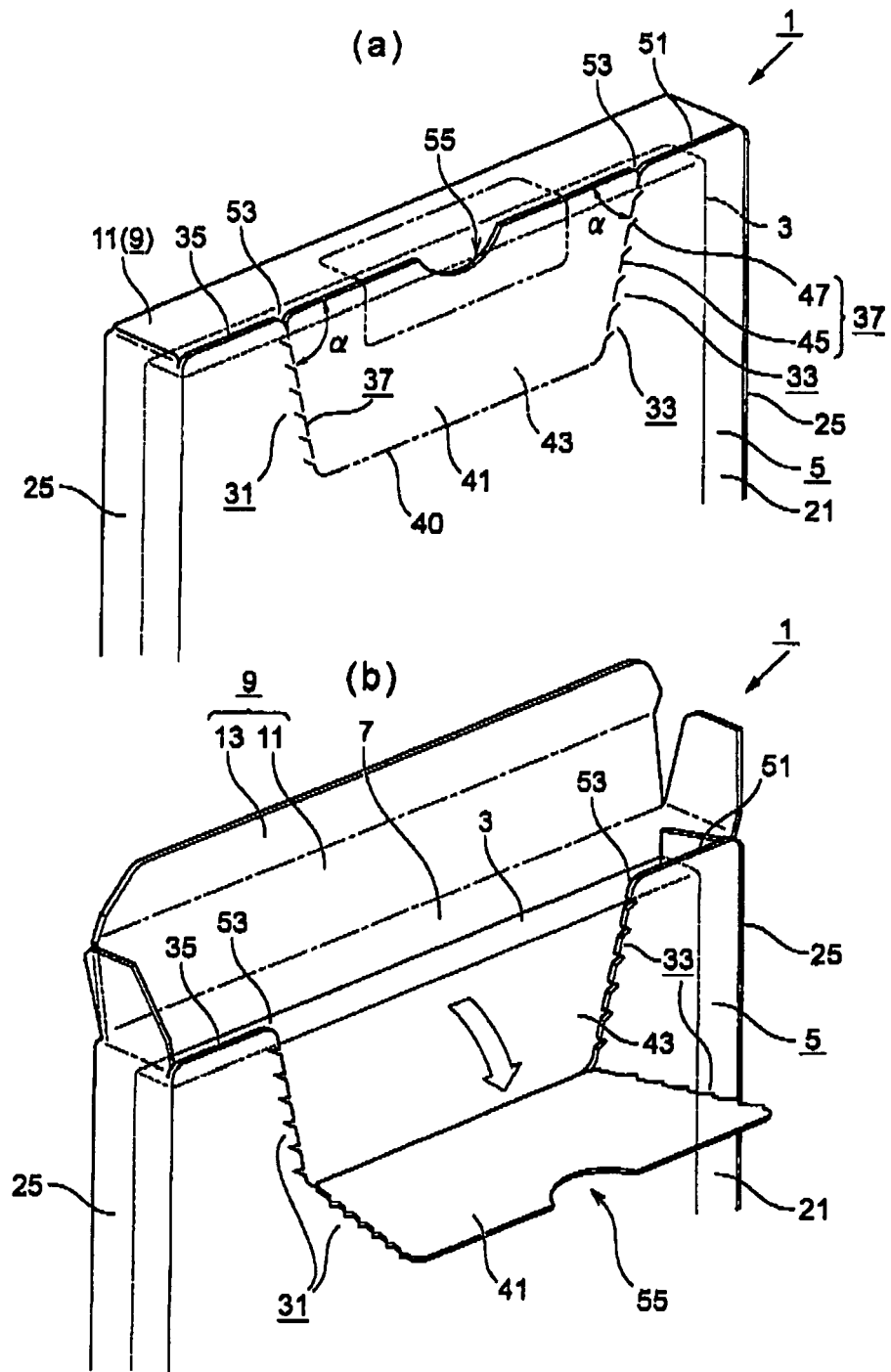


Fig. 4

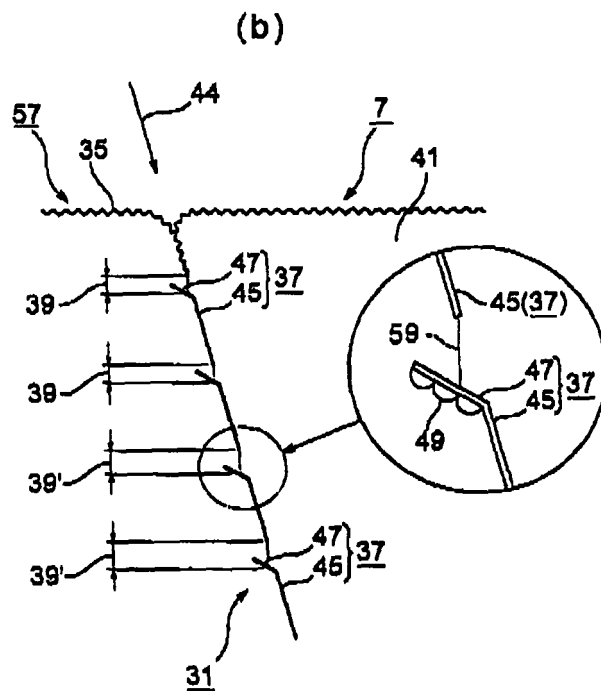
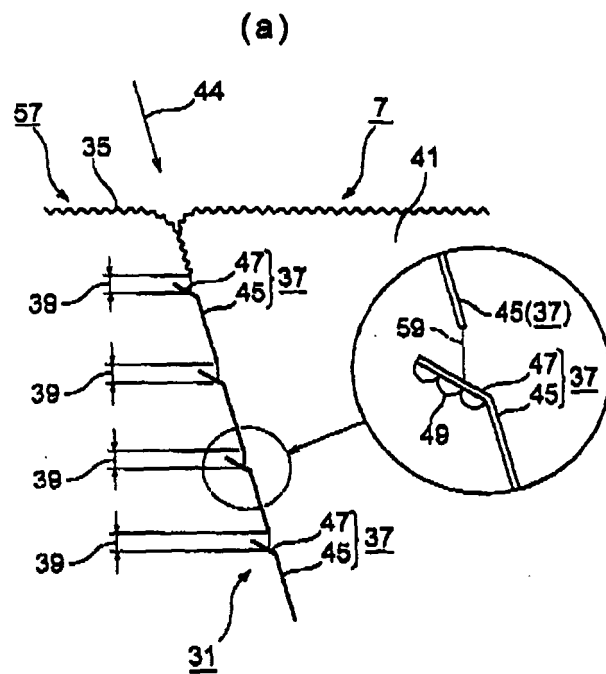


Fig.5

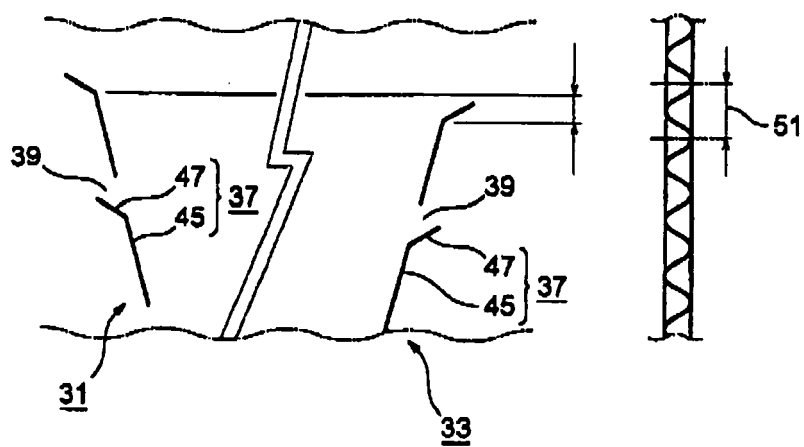
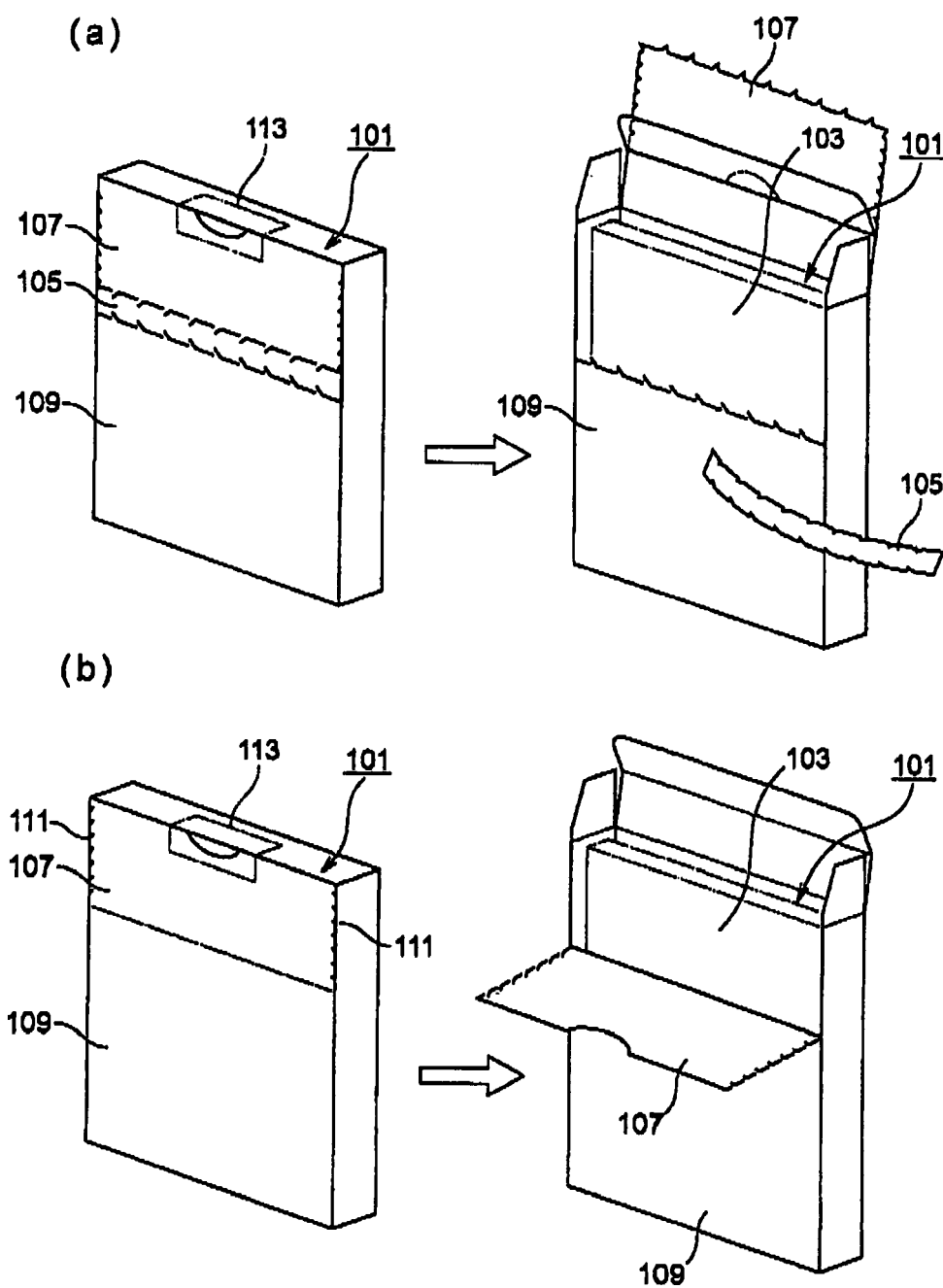


Fig. 6





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 02 0294

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 859 275 A (AGFA-GEVAERT) 19 August 1998 (1998-08-19) * the whole document * -----	1-7	INV. G03C3/00
			TECHNICAL FIELDS SEARCHED (IPC)
			G03C B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 November 2006	Examiner Magrizos, Simeon
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 8114889 A [0003]