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(54) **Container made of paper-base laminate and apparatus for producing same**

Behälter aus Papierlaminat und Vorrichtung zu seiner Herstellung

Réceptient en carton laminé et machine pour la réalisation d'un tel réceptient

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EP 0 582 003 B1

Description

The present invention relates to a container made of paper-base laminate and filled with contents such as fluid food, and an apparatus for producing such containers.

Such containers have a closed bottom portion generally bulging outward, are therefore not positionable upright with good stability but tend to rock, and can not be displayed in a stable position. Further when allowed to rock, the container becomes damaged at the corners of the closed bottom portion.

To overcome the above problem, the present applicant has already proposed a container having a bottom portion which is recessed in the form of a pyramid centrally thereof, and an apparatus for producing the container (see U.S. Patent No. 4,838,847).

The container proposed by the present applicant is positionable with good stability, whereas the liquid level within the container rises by an amount corresponding to the bottom recess of the container. The liquid is then likely to spill from the container during transport. This must be prevented by reducing the transport speed of the container transport conveyor, consequently entailing the problem of impairing the efficiency of the packaging machine.

On the other hand, the container producing apparatus has mandrels and a pressure bonding member. To form the recessed bottom portion, each of the mandrels needs to be formed in its forward end face with a cavity defined by a pyramidal recessed surface, and the bonding member has a pressing face which must be provided with a projection corresponding to the cavity. However, the cavity and the projection are not easy to make, necessitating an increased machining cost.

SUMMARY OF THE INVENTION

The main object of the present invention is to overcome the foregoing problems and provide a paper-base laminate container and a device for bonding the bottom portion of a container blank with pressure to produce the container.

The container of the present invention is made of paper-base laminate and has a bottom closure formed with a recess having an inverted V-shaped cross section and extending across the bottom closure through the center thereof for positioning the container upright with stability.

Such a container according the pre-characterising part of claim 1 is known from GB-A-511330. In said known structure seal panels, which are integral with outer bottom panels, are bent outwardly and protrude into the recess in the bottom.

The invention provides a container according claim 1.

The present invention also provides an apparatus for producing the above container. This apparatus comprises an intermittently drivable rotor having radial man-

drels each adapted to support a tubular container blank of square to rectangular cross section as fitted therearound, the mandrels being so arranged as to successively stop at each of processing stations including a pressure bonding station, and a bottom bonding unit disposed at the pressure bonding station, each of the mandrels having in a forward end face thereof a groove for forming the recess, the bottom bonding unit comprising a bonding member having a pressing face, the pressing face being opposed to the forward end face of the mandrel as stopped at the pressure bonding station, the pressing face being provided with a ridge corresponding to the groove.

The paper-base laminate container of the invention is formed in its bottom closure with a recess of inverted V-shaped cross section extending across the bottom closure through the center thereof, so that the recess diminishes the bulge of the bottom closure and does not raise the liquid level in the container so greatly as the conventional pyramidal recess, consequently obviating the likelihood of the liquid spilling from the container, permitting the packaging machine to exhibit its ability without impairment and giving improved stability to the container.

With the apparatus for producing the container, each of the mandrels is provided in its forward end face with a groove for forming the recess, and the bonding member is provided on its pressing face with a ridge corresponding to the groove. The groove and the ridge are easier to make than the cavity defined by a pyramidal recessed surface and the projection corresponding to the cavity. Accordingly, the mandrels and the bonding member can be machined at a lower cost.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a container bottom portion;

FIG. 2 is a perspective view showing a step of forming the container bottom portion;

FIG. 3 is a perspective view showing a step of forming the container bottom portion subsequent to the step of FIG. 2;

FIG. 4 is a perspective view of the container bottom portion before it is formed;

FIG. 5 is a diagram illustrating laps of a container blank for forming the container bottom portion;

FIG. 6 is a sectional view of the container bottom portion;

FIG. 7 is a side elevation schematically showing a packaging machine including a bottom bonding unit;

FIG. 8 is a perspective view showing the forward end face of a mandrel;

FIG. 9 is a perspective view showing a pressing face of a bonding member;

FIG. 10 is a view in section taken along the line X-X in FIG. 8; and

FIG. 11 is a view in section taken along the line XI-XI in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the invention will be described below with reference to the drawings.

With reference to FIG. 4 showing a container before its bottom portion is closed, the container comprises a top closure 13, trunk 14 and bottom closure 15 which are divided by upper and lower scores 11, 12 but which are integral with one another as arranged downward. Of these portions 13 to 15, the top closure 13 and the trunk 14 are irrelevant to the present invention and will not be described therefore.

The bottom closure 15 has four generally rectangular panels, i.e., first to fourth bottom panels 21 to 24. The fourth bottom panel 24 has an edge integral with a striplike fifth bottom panel 25, which is joined to the inner surface of the first bottom panel 21, whereby the four bottom panels 21 to 24 are made to extend endlessly. Striplike seal panels 26, 27 are integral with the forward ends of the first bottom panel 21 and the third bottom panel 23, respectively. The second bottom panel 22 and the fourth bottom panels 24 are formed with V-shaped scores 28, 29, respectively.

The bottom portion of the container is formed in the manner to be described below with reference to FIGS. 2 and 3. First, the second bottom panel 22 and the fourth bottom panel 24 are each folded on itself along the V-shaped score 28 or 29 while being folded inward, and the first bottom panel 21 and the third bottom panel 23 are then folded over the folded second and fourth bottom panels 22 and 24. The seal panel 26 integral with the first bottom panel 21 is further inserted into a clearance between the third bottom panel 23 and triangular portions of the second and fourth bottom panels 22, 24 thereunder, and the seal panel 27 integral with the third bottom panel 23 is lapped over the first bottom panel 21. Each of the panels is then bonded to another one of the panels with pressure at portions thereof where the panels are in contact with each other.

According to the lapping mode of the container blank, the bottom closure 15 thus formed is divided into the five regions to be described below with reference to FIG. 5. A first region 31 is a striplike portion extending across the bottom of the container through the center thereof and including two triangular second regions 32 at the midportion of its length, with their apexes butting against each other. Except for the second regions 32, the first region 31 has four times the thickness of the container blank. The second regions 32 have twice the blank thickness. The bottom closure 15 has another region having four times the thickness of the blank, i.e., a third region 33 including the lap of fifth bottom panel 25. The third region 33 partly includes a region 33a having twice the blank thickness. Generally triangular fourth regions 34 having three times the thickness of the blank

are present on opposite sides of the first region 31. The remaining portions are fifth regions 35 having the thickness of the blank.

As shown in FIGS. 1 and 6, the first region 31 is formed with a recess 36 having an inverted V-shaped cross section.

The striplike region including the two seal panels 26, 27 has four times the thickness of the blank given by laps and is relatively great in strength. The presence of the recess 36 in this region of great strength reinforces the bottom closure 15, giving an increased strength to the bottom closure 15 of the container.

A packaging machine will be described next which includes a unit for bonding the bottom portion of the container with pressure. As seen in FIG. 7, the machine comprises a rotor 42 disposed above the starting end of a transport path provided by a container transport conveyor 41. The rotor 42 has six radial mandrels 43 and is intermittently driven so that the mandrels 43 successively stop at each of six stations, i.e., first to sixth processing stations I to VI. The first to sixth processing stations I to VI are provided with a container feeder 44, primary container bottom heater 45, secondary container bottom heater 46, container bottom folding unit 47, container bottom bonding unit 48 and container transfer unit 49, respectively.

Of these devices and units, those other than the mandrels 43 and the bottom bonding unit 48 are known and therefore will not be described in detail.

Each of the mandrels 43 has a mandrel cap 51 attached to its forward end. The bottom bonding unit 48 has a bonding member 52, which is attached to the piston rod of a hydraulic cylinder 53 and is movable axially of the mandrel 43 as stopped at the fifth processing station V.

As shown in greater detail in FIGS. 8 and 10, the mandrel cap 51 has an outer face 54 which is formed with a groove 55 having a V-shaped cross section for forming the recess 36 in the bottom closure 15. The grooved portion 55 serves to press the first region 31. The groove 55 extends across the outer face 54 through the center thereof and has a width W_2 approximately equal to the width W_1 of the first region 31 (see FIG. 5). For example when the bottom closure 15 is 70 mm x 70 mm in size, the groove 55 has a depth D of about 2.5 mm.

Referring to FIGS. 9 and 11, the bonding member 52 has a pressing face 56 which is formed with a projection 57 V-shaped in cross section and corresponding to the groove 55. The base end of the projection 57 is at a level a small distance L , e.g., 0.3 mm, below a reference plane S of the pressing face 56. The height H of the projection 57 from the reference plane S is approximately equal to the depth D of the groove 55. The projection 57 is provided at the mid-portion of its length with two triangular protrusions 58 for pressing the second regions 32. The base end of each protrusion 58 is positioned at the same level as the reference plane S . At one side of the projection 57, one corner of the pressing face 56 has a

recessed portion 59 for pressing the third region 33. The recessed portion 59 is at a level lower than the reference plane S by the above-mentioned distance L.

When the bonding member 52 is pressed from outside against the bottom closure 15 which is folded flat and supported by the forward end of the mandrel 43 from inside, the panels forming the closure 15 are bonded together with the pressure. At this time, the bottom closure 15 is shaped in conformity with the groove 55 of the mandrel 43 and the projection 57 of the bonding member 52, that is, the first region 31 is pressed into an inverted V-shape in cross section, whereby the recess 36 is formed.

Claims

1. A container made of paper-base laminate and having a bottom closure (15), the bottom closure (15) being formed with a recess (36) having an inverted V-shaped cross section and extending across the bottom closure through the center thereof for positioning the container upright with stability, wherein the bottom closure (15) has a pair of outer bottom panels (21, 23) providing a bottom surface for the bottom closure (15), a pair of inner bottom panels (22, 24) each folded on itself inside the outer bottom panels (21, 23) and a pair of striplike seal panels (26, 27) integral with forward ends of the outer bottom panels (21, 23) respectively, characterised in that each of the seal panels (26, 27) overlaps the forward end portion of the outer bottom panel (21 or 23) integral with the other seal panel, each of the panels being bonded to another one of the panels with pressure at portions thereof where the panels are in contact with each other to form a bonded region (31) having four times the thickness of the panels, the recess (36) being positioned at a striplike portion including the bonded region (31).
2. An apparatus for producing containers made of paper-base laminate and each having a bottom closure (15), the bottom closure (15) being formed with a recess (36) having an inverted V-shaped cross section and extending across the bottom closure through the center thereof for positioning the container upright with stability, the apparatus comprising:
 - an intermittently drivable rotor (42) having radial mandrels (43) each adapted to support a tubular container blank of square to rectangular cross section as fitted therearound, the mandrels (43) being so arranged as to successively stop at each of processing stations I to VI including a pressure bonding station V, and
 - a bottom bonding unit (48) disposed at the pressure bonding station V,
 - each of the mandrels (43) having in a forward end face (54) thereof a groove (55) for forming the recess (36),

the bottom bonding unit (48) comprising a bonding member (52) having a pressing face (56), the pressing face (56) being opposed to the forward end face (54) of the mandrel (43) as stopped at the pressure bonding station V, the pressing face (56) being provided with a ridge (57) corresponding to the groove (55).

3. An apparatus as defined in claim 3 wherein the bottom closure (15) has a pair of outer bottom panels (21, 23) providing a bottom surface for the bottom closure (15), a pair of inner bottom panels (22, 24) each folded on itself inside the outer bottom panels (21, 23), and a pair of striplike seal panels (26, 27) integral with forward ends of the outer bottom panels (21, 23) respectively, each of the seal panels (26, 27) lapping over the forward end portion of the outer bottom panel (21) or (23) integral with the other seal panel, each of the panels being bonded to another one of the panels with pressure at portions thereof where the panels are in contact with each other to form a bonded region (31) having four times the thickness of the panels, the recess (36) being positioned at a striplike portion including the bonded region (31), the groove (55) and the projection (57) having a width in match with the width of the striplike portion.

Patentansprüche

1. Ein Behälter aus einem Laminat auf Papierbasis und mit einem Bodenverschluß (15), wobei der Bodenverschluß (15) mit einer Vertiefung (36) versehen ist, die einen umgekehrt V-förmigen Querschnitt hat und sich über den Bodenverschluß durch dessen Mitte erstreckt, um den Behälter aufrecht mit Stabilität zu Positionieren, worin der Bodenverschluß (15) ein Paar von äußeren Bodenplatten (21, 23), die eine Bodenfläche für den Bodenverschluß (15) bilden, ein Paar von inneren Bodenplatten (22, 24), von denen jede auf sich selbst innenseitig der äußeren Bodenplatten (21, 23) gefaltet ist, und ein Paar von streifenähnlichen Schließplatten (26, 27) jeweils hat integral mit vorderen Endbereichen der äusseren Bodenplatten (21, 23), dadurch gekennzeichnet, daß jede der Schließplatten (26, 27) den vorderen Endbereich der äußeren Bodenplatte (21 oder 23) integral mit der anderen Schließplatte überlappt, wobei jede der Platten mit einer anderen der Platten an Teilen von ihnen, wo die Platten miteinander in Kontakt stehen, mit Druck verbunden ist, um einen verbundenen Bereich (31) zu bilden, der die vierfache Dicke der Platten hat, wobei die Vertiefung (36) an einem den verbundenen Bereich umfassenden streifenähnlichen Bereich positioniert ist.
2. Eine Vorrichtung zur Herstellung von Behältern aus einem Laminat auf Papierbasis und mit jeweils

einem Bodenverschluß (15), wobei der Bodenverschluß (15) mit einer Vertiefung (36) versehen ist, die einen umgekehrt V-förmigen Querschnitt hat und sich über den Bodenverschluß durch dessen Mitte erstreckt, um den Behälter aufrecht mit Stabilität zu positionieren, wobei die Vorrichtung aufweist:

einen intermittierend antreibbaren Rotor (42) mit radialen Dornen (43), von denen jeder geeignet ist, einen darauf aufgesetzten rohrförmigen Behälterzuschchnitt mit quadratischem bis rechteckigem Querschnitt zu tragen, wobei die Dorne (43) so angeordnet sind, daß sie aufeinanderfolgend an jeder von mehreren Bearbeitungsstationen I bis VI einschließlich einer Druckverbindungsstation V angehalten werden können, und einer Bodenverbindungseinheit (48), die an der Druckverbindungsstation V angeordnet ist, wobei jeder der Dorne (43) in seiner vorderen Endfläche (54) eine Rille (55) zur Bildung der Vertiefung (36) hat, die Bodenverbindungseinheit (48) ein Verbindungselement (52) mit einer Druckfläche (56) hat, wobei die Druckfläche (56) der vorderen Endfläche (54) des Dorns (43), der an der Druckverbindungsstation V angehalten ist, gegenüberliegt, wobei die Druckfläche (56) mit einem der Rille (55) entsprechenden Steg (57) versehen ist.

3. Eine Vorrichtung wie in Anspruch 2 definiert, worin der Bodenverschluß (15) ein Paar von äußeren Bodenplatten (21, 23), die eine Bodenfläche für den Bodenverschluß (15) bilden, ein Paar von inneren Bodenplatten (22, 24), von denen jede auf sich selbst innenseitig der äußeren Bodenplatten (21, 23) gefaltet ist, und ein Paar von streifenähnlichen Schließplatten (26, 27) jeweils hat integral mit vorderen Endbereichen der äusseren Bodenplatten (21, 23), dadurch gekennzeichnet, daß jede der Schließplatten (26, 27) den vorderen Endbereich der äußeren Bodenplatte (21) oder (23) integral mit der anderen Schließplatte überlappt, wobei jede der Platten mit einer anderen der Platten an Teilen von ihnen, wo die Platten miteinander in Kontakt stehen, mit Druck verbunden ist, um einen verbundenen Bereich (31) zu bilden, der die vierfache Dicke der Platten hat, wobei die Vertiefung (36) an einem den verbundenen Bereich umfassenden streifenähnlichen Bereich positioniert ist.

Revendications

1. Récipient fait d'un matériau stratifié à base de papier et pourvu d'une fermeture de fond (15) comportant un creux (36) qui présente une section transversale en forme de V inversé et qui s'étend d'un bout à l'autre de la fermeture de fond au centre de celle-ci pour permettre de placer le récipient debout avec une certaine stabilité, la fermeture de

fond (15) comportant deux panneaux de fond extérieurs (21, 23) qui définissent une surface de fond pour la fermeture de fond (15), deux panneaux de fond intérieurs (22, 24) dont chacun est replié sur lui-même à l'intérieur des panneaux de fond extérieurs (21, 23), et deux panneaux de fermeture hermétique en forme de bande (26, 27) respectivement solidaires d'extrémités avant des panneaux de fond extérieurs (21, 23), caractérisé en ce que chacun des panneaux de fermeture hermétique (26, 27) recouvre la partie d'extrémité avant du panneau de fond extérieur (21 ou 23), solidaire de l'autre panneau de fermeture hermétique, en ce que chacun des panneaux est assemblé par adhérence avec un autre des panneaux grâce à une pression exercée au niveau de leurs parties de contact mutuel pour former une zone assemblée par adhérence (31) ayant quatre fois l'épaisseur des panneaux, et en ce que le creux (36) est positionné au niveau d'une partie en forme de bande comprenant la zone assemblée par adhérence (31).

2. Appareil pour fabriquer des récipients faits d'un matériau stratifié à base de papier et pourvus chacun d'une fermeture de fond (15) comportant un creux (36) qui présente une section transversale en forme de V inversé et qui s'étend d'un bout à l'autre de la fermeture de fond au centre de celle-ci pour permettre de placer le récipient debout avec une certaine stabilité, l'appareil comprenant :

un rotor (42) apte à être entraîné d'une manière intermittente et comportant des mandrins radiaux (43) dont chacun est adapté pour supporter une ébauche de récipient tubulaire de section transversale carrée à rectangulaire, lorsqu'elle est ajustée autour de lui, les mandrins (43) étant disposés de manière à s'arrêter successivement au niveau de chacun de postes de traitement I à VI comprenant un poste d'assemblage par adhérence sous pression V, et

une unité d'assemblage par adhérence de fonds (48) disposée au niveau du poste d'assemblage par adhérence sous pression V,

chacun des mandrins (43) comportant sur sa face d'extrémité avant (54) une gorge (55) destinée à former le creux (36),

l'unité d'assemblage par adhérence de fonds (48) comprenant un organe d'assemblage par adhérence (52) muni d'une face de pression (56) située en vis-à-vis de la face d'extrémité avant (54) du mandrin (43) lorsque celui-ci est arrêté au niveau du poste d'assemblage par adhérence sous pression V, face de pression (56) qui est pourvue d'une nervure (57) correspondant à la gorge (55).

3. Appareil tel que défini dans la revendication 2, dans lequel la fermeture de fond (15) comporte deux panneaux de fond extérieurs (21, 23) qui définis-

sent une surface de fond pour la fermeture de fond (15), deux panneaux de fond intérieurs (22, 24) dont chacun est replié sur lui-même à l'intérieur des panneaux de fond extérieurs (21, 23), et deux panneaux de fermeture hermétique en forme de bande (26, 27) respectivement solidaires des extrémités avant des panneaux de fond extérieurs (21, 23), chacun des panneaux de fermeture hermétique (26, 27) recouvrant la partie d'extrémité avant du panneau de fond extérieur (21) ou (23), solidaire de l'autre panneau de fermeture hermétique, chacun des panneaux étant assemblé par adhérence avec un autre des panneaux grâce à une pression exercée au niveau de leurs parties en contact mutuel pour former une zone assemblée par adhérence (31) ayant quatre fois l'épaisseur des panneaux, le creux (36) étant positionné au niveau d'une partie en forme de bande comprenant la zone assemblée par adhérence (31), la gorge (55) et la partie saillante (57) ayant une largeur correspondant à la largeur de la partie en forme de bande.

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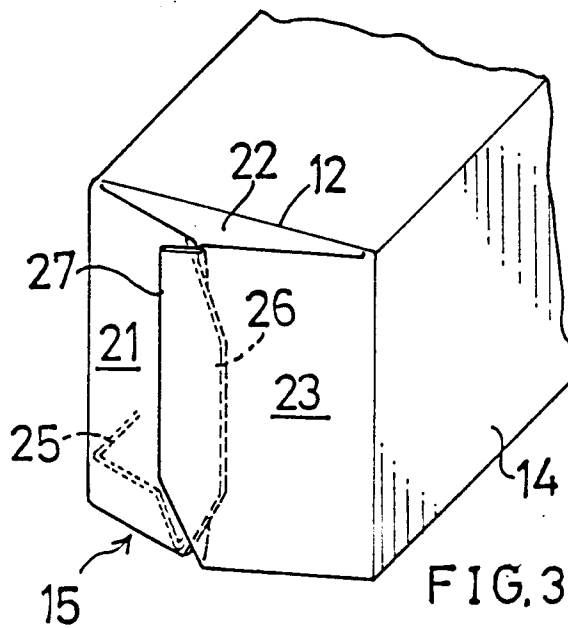
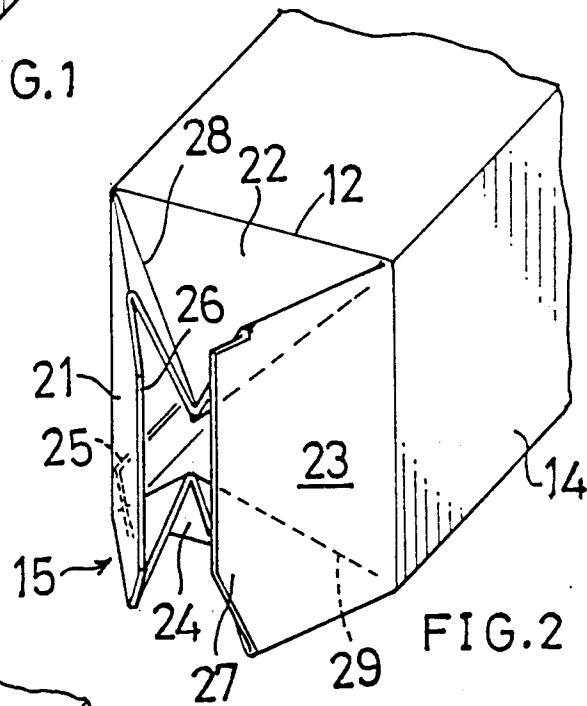
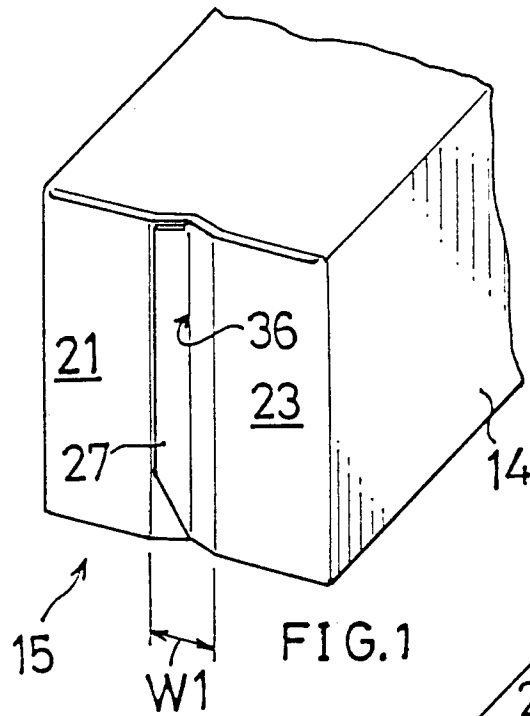
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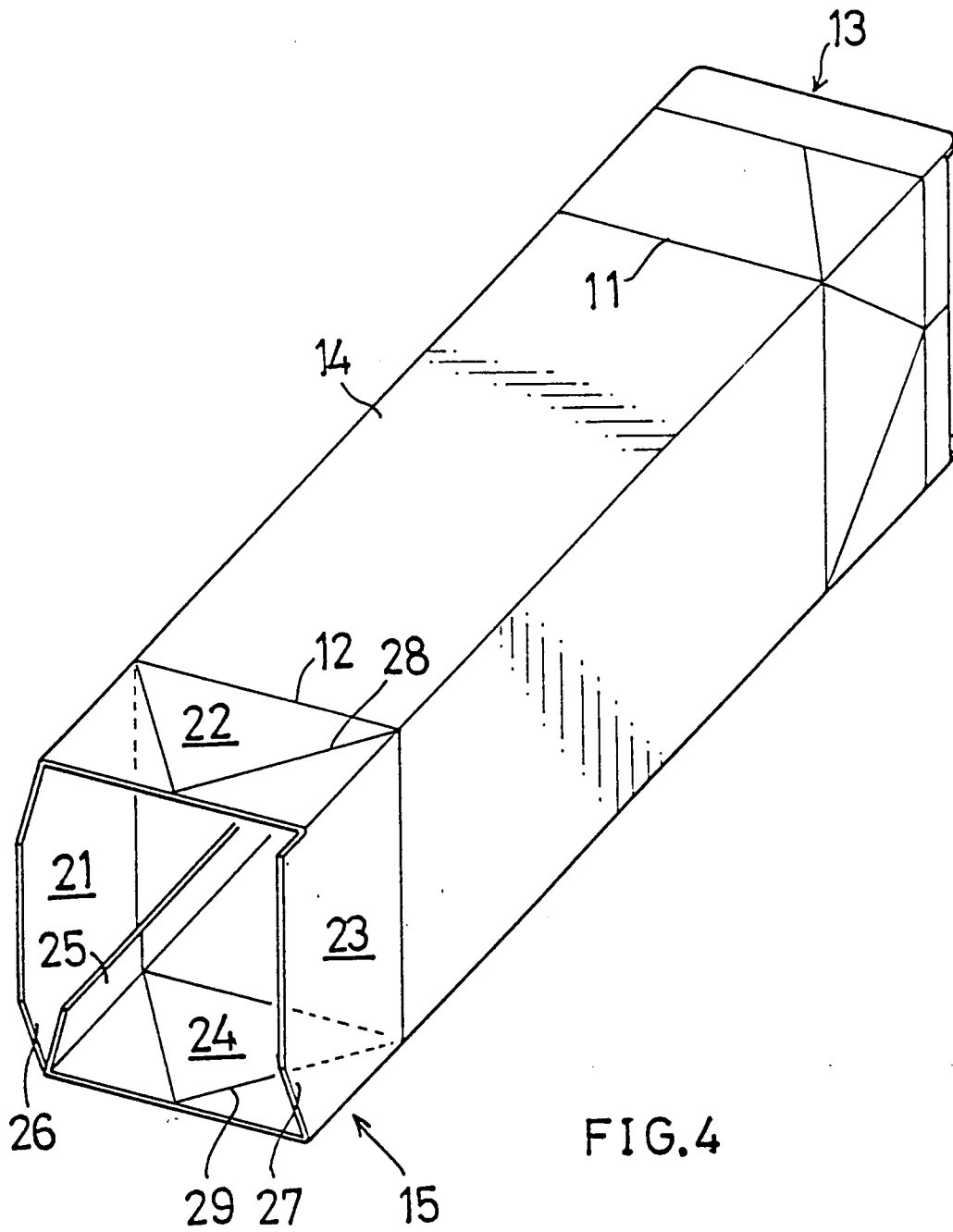
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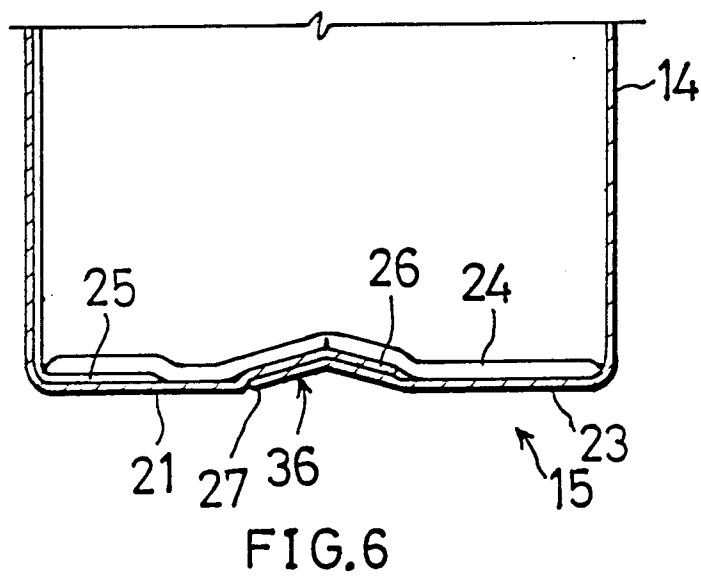
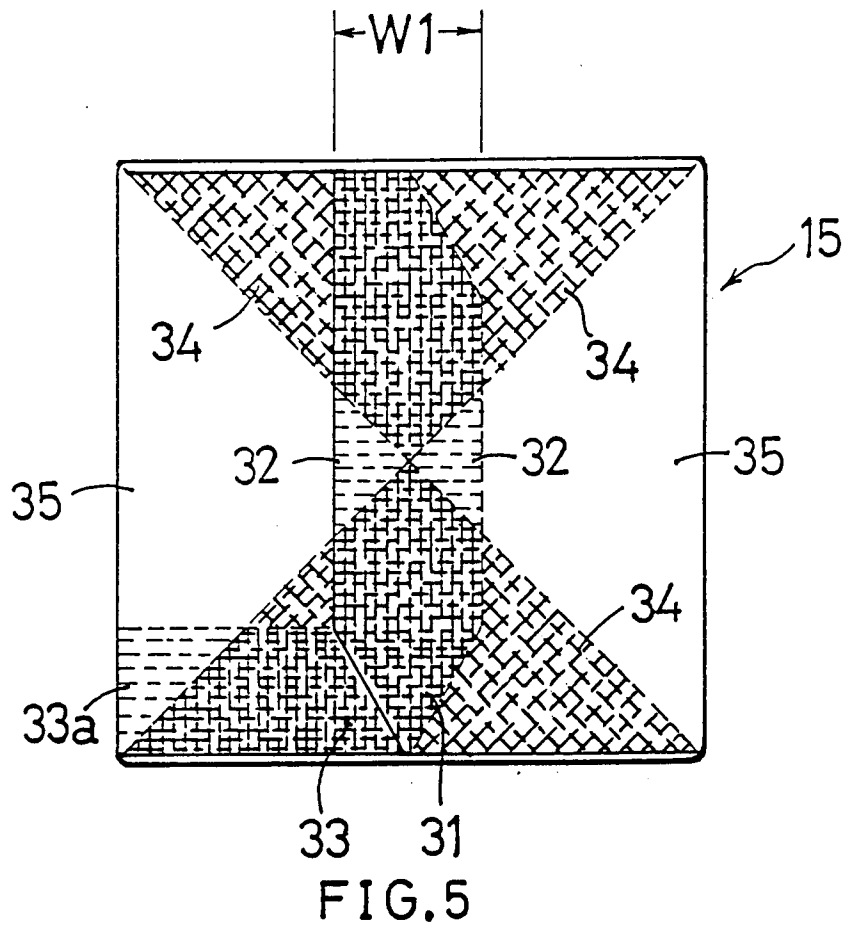
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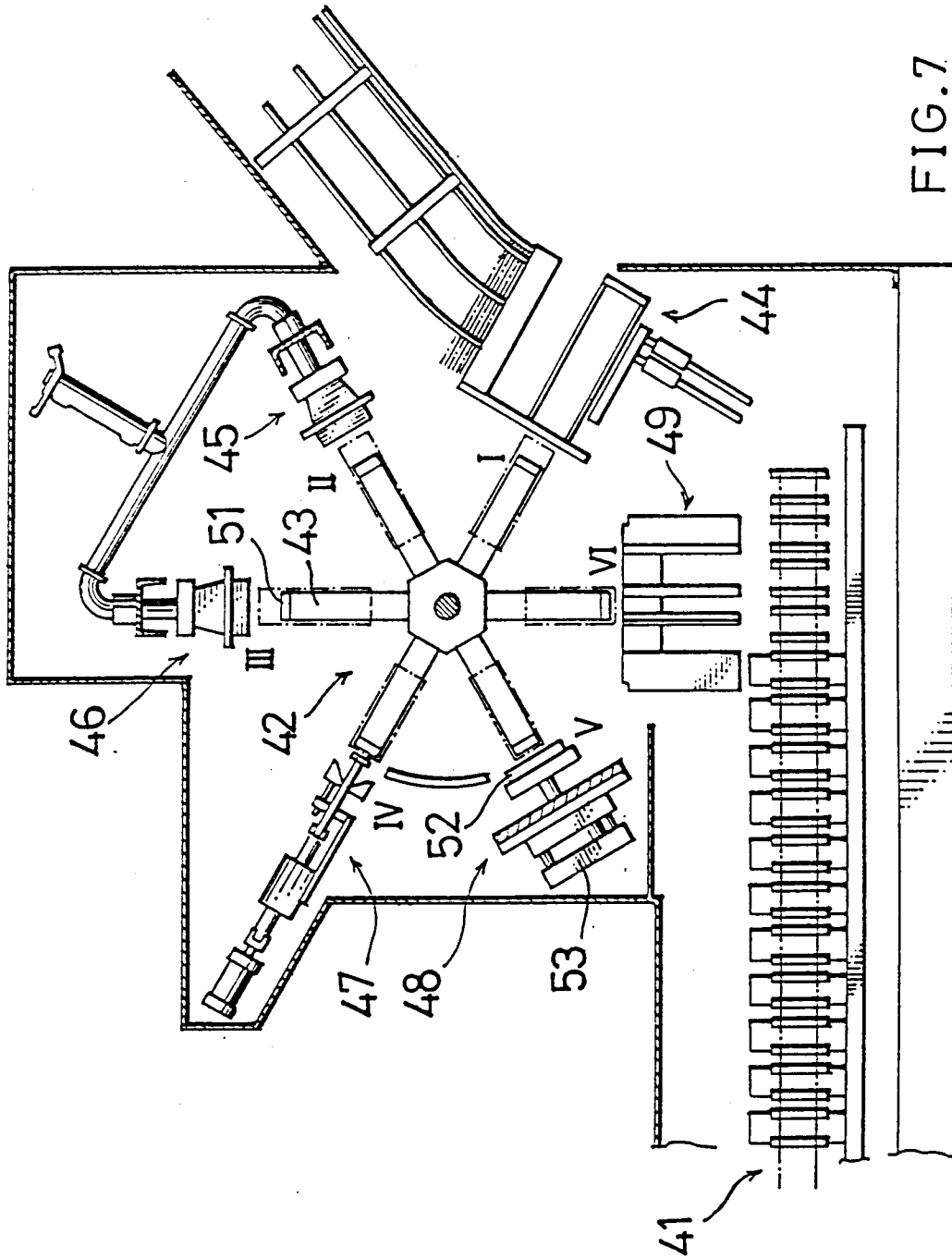
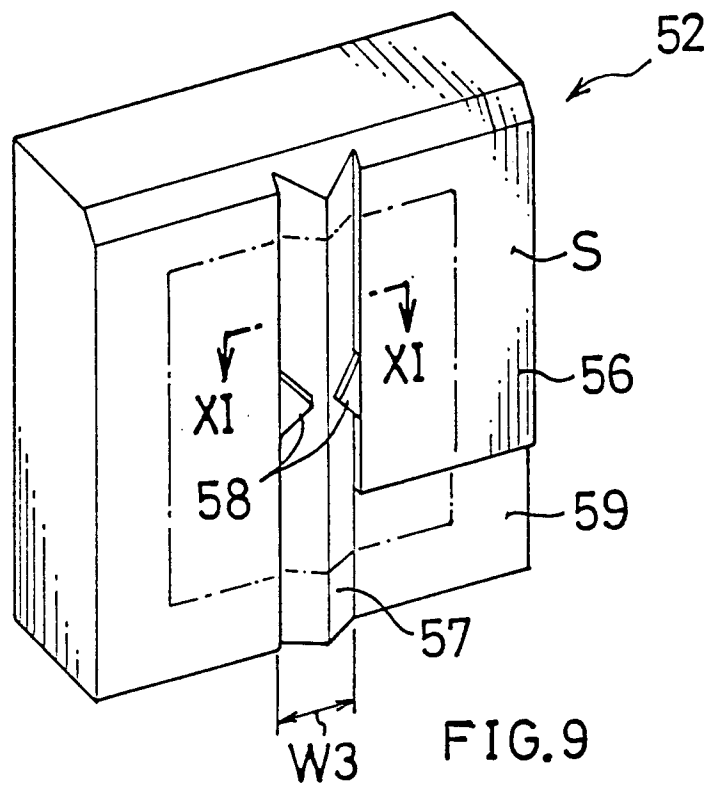
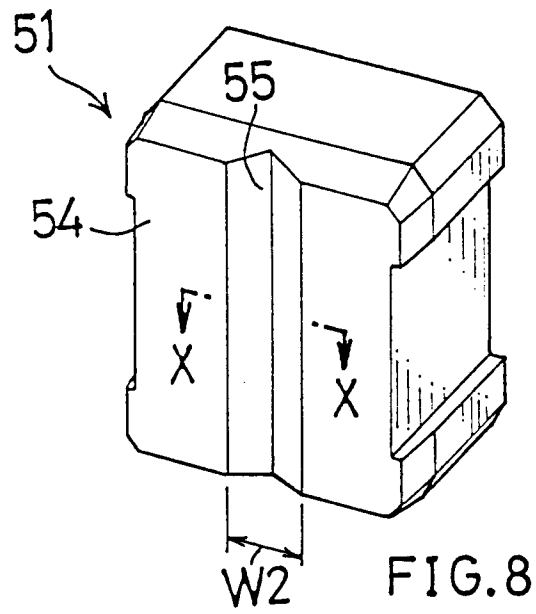


FIG. 7



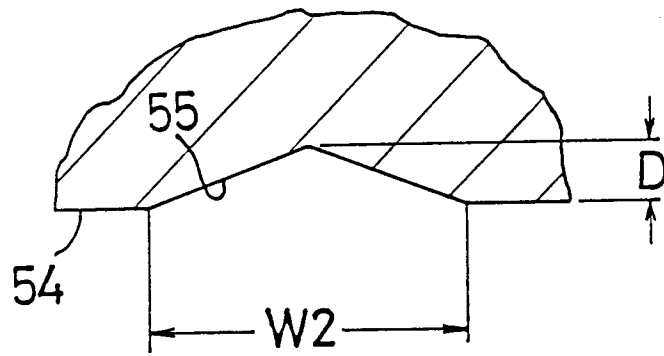


FIG. 10

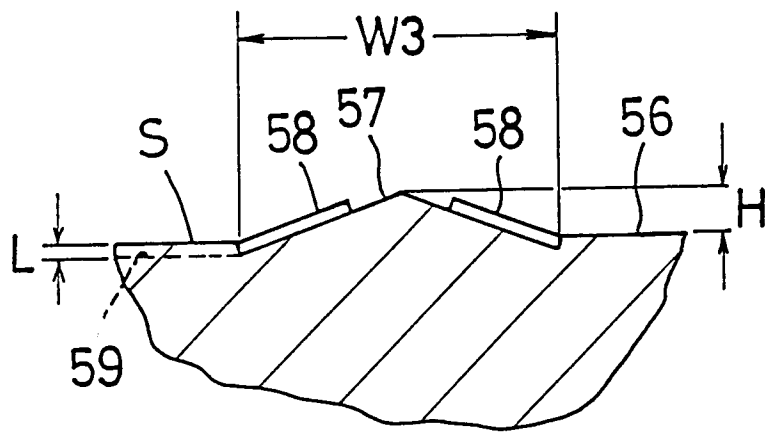


FIG. 11