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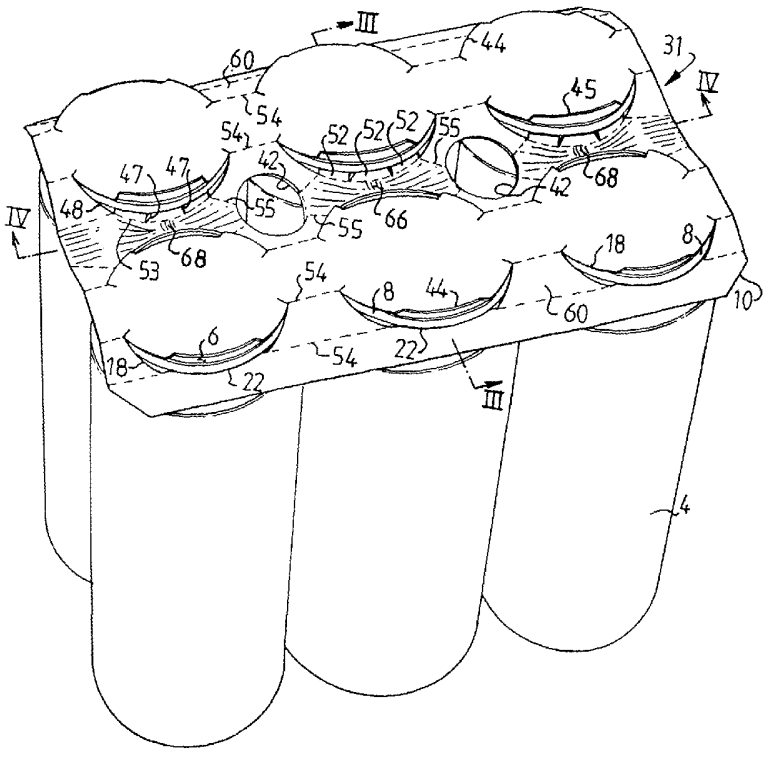
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(54) Title: A CARRIER FOR CANS, A CARDBOARD BLANK FOR A CARRIER FOR CANS AND A METHOD TO ASSEMBLE A CARDBOARD BLANK



(57) Abstract: The present invention relates to a carrier of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans (4), being disposed in at least two rows and having an inclined upper part and a top closure (6) with a projecting circular rim (8). The carrier (31) is produced from a plane blank (32), having, for each can to be connected by the carrier, two mutually opposing, essentially arcuate slits (44, 45), the outer edges of which engage below the rim (8) of the cans when the carrier is assembled on the plurality of cans to connect the carrier and the cans and form a package assembly. Gripping recesses (42), adapted to be gripped by fingers to lift and handle the package assembly, are centrally disposed in the carrier blank (32) between the rows of cans (4), and a bowl-shaped indentation (66) is formed centrally in the carrier (31) between said gripping recesses (42) and the rows of cans (4). The invention also relates to a plane blank for a carrier of cardboard and a method to assemble a plane blank of cardboard.

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A CARRIER FOR CANS, A CARDBOARD BLANK FOR A CARRIER FOR CANS AND A METHOD TO ASSEMBLE A CARDBOARD BLANK

Field of the invention

The present invention relates to a carrier of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans being disposed in at least two rows and having an inclined upper part and a top closure with a projecting circular rim. The carrier is produced from a plane blank, having, for each can connected by the carrier, two mutually opposing, essentially arcuate slits, the outer edges of which engage below the rim of the cans when the carrier is assembled on the plurality of cans to connect the carrier and the cans and form a package assembly.

The invention also relates to a plane blank of cardboard for a carrier for cans and a method to assemble a plane blank of cardbord.

Background of the invention

Cylindrical cans are used in the beverage industries for drinks, such as for instance mineral water, bear and soft drinks. For carrying a plurality of cans, package assemblies are provided, which may comprise from two up to ten cans. Heretofore there have been many different types of package assembly means provided for enabling a plurality of cans to be lifted and handled by, for example, a consumer.

Plastic materials are used as package assembly means, e.g. in the form of a plastic film wrap extending around the packaged cans or in the form of mutually connected plastic rings which are applied around the cans. These package assembly means, however, are costly and cause environmental problems. Other types of carriers for cans, made of cardboard, having both environmental and commercial advantages, have thus been introduced. Also combinations of plastic and cardboard materials have been used as package assembly means.

Considering the extensive use of package assemblies for drinks and the great quantity of cans sold in these packages or assemblies, the cost of the individual package, including material as well as assembly costs, is an important factor in the cost of the packaged assembly as sold. Hence, relatively small changes in the costs of the package assemblies are very important. In addition, it is important that the contents of the packages are clearly visible and can be identified in the package assembly.

One type of carrier of cardboard configured as a banderole or a so called wrap-around extending around the group of cans are frequently used and is, for example, disclosed in US-A-3,194,476. This wrap-around carrier is costly and complicated to apply around the cans in a continuously running production line. A further disadvantage is that the contents of the package can not easily be identified by the consumer.

Other types of carriers of cardboard are known, which are adapted to be applied against the upper side of the group of containers and to be connected to the containers. A carrier of this type is described, for example, in US-A-3,094,210. The carrier is produced from a plane cardboard blank having two opposing U-shaped slits for each container to be connected by the carrier. The plane blank is assembled on the group of containers by folding side flanges downwardly towards the sides of the container, such that outer edges of the slits in the carrier engage below the shoulder of the containers. However, in order to prevent the edges of the slits to disengage from the shoulder, following mutual movements between the containers, an additional corresponding carrier must be applied on the bottom part of the containers. The carrier as described above is disadvantageous in that it can be used for a single row of containers only and is costly due to material costs and a more complicated assembly of a two-piece carrier. A further disadvantage is that the side flanges of the carrier projecting downwardly along the sides of the containers, may easily get caught by an adjacent package

assembly or some other element, such that the flanges are forced upwardly and the edges of the slits are disengaged from the shoulder of the container.

A similar carrier for cans is disclosed in EP-B-0496807. The carrier comprises two opposing arcuate slits for each can and short incisions extending radially from said slits. A plurality of flaps, formed between the incisions, engage below the projecting neck of the cans. Grasping flaps are provided on each side of the carrier adapted to be folded when the carrier with the cans is grasped and lifted by the user. The carrier as disclosed has proven insufficient to securely engage the carrier on the cans, especially when lifting forces are applied in the gripping recesses in the sides of the carrier. The carrier has a centrally arranged folding line, which serves as a "hinge " when the lifting forces are applied in the gripping recesses in the opposing sides of the carrier, such that the cans are separated and tend to disengage from the carrier. In addition, the side flaps are forced by the lifting forces in an upward direction, thus further increasing the risk for disengagement of the carrier from the cans.

Basic idea of the invention

The object of the present invention is to solve the above-mentioned problems by providing a carrier, for a plurality of cans disposed in at least two rows, which may be securely fitted to the cans in order to connect, lock and support the cans and provide a package assembly which may be lifted and handled without risking disengagement, and which is material-effective and may be readily and effectively applied to and assembled on a plurality of cans.

This object is achieved in accordance with the invention in a carrier for cans, a cardboard blank and a method to assemble a cardboard blank as described above and with the characterising features as defined in the appended claims.

In accordance with the invention, gripping recesses are disposed between the rows of cans and a bowl-shaped indentation is formed in the carrier between the gripping recesses and the rows of cans. The plane blank has a central portion intended to be accommodated between the rows of cans in the assembled state, which portion is slightly wider than the actual spacing between the cans, such that indentations are formed between the rows of cans when the carrier is assembled on the cans. The assembled carrier according to the invention is stiffened by the centrally disposed bowl-shaped indentations, such that the cans are steadily supported in the carrier. The lifting forces, applied in the gripping recesses between the rows of cans, are distributed in the direction of the engagement tongues in the inner slits, such that the abutting pressure on and below the rim of the can is increased. In forming the bowl-shaped indentation in the centre of the plane blank, the engagement tongues in the outer slits abutting the rim of the can, are forced towards the centre of the package assembly, thus increasing the pressure of the engagement tongues in the outer slits on the rim of the can and tightening the connection of the carrier to the cans. By these means, a steady and secure connection of the cans in the carrier is achieved. According to a preferred embodiment of the invention, opposing arcuate slits for each can to be connected by the carrier comprise an arcuate intermediate section between two arcuate end sections. The intermediate section is formed radially inside the arcuate end sections of the slit, such that an engagement tongue is formed in the intermediate section of the slit. The engagement tongue is adapted to slip over the projecting rim of the can when the side panels and the centre portion of the blank are forced towards the inclined sides of the can and to snap in below the rim to securely and effectively lock the carrier to the cans. The curvature of the engagement tongue thoroughly follows the curvature of the can and through the deflection of the end sections of the slits and the ensuing tension is these sections, the engagement tongues are tightened to provide a secure and steady connection.

The foregoing and other objects and advantages of the invention will be made more apparent in the following description of embodiments of the invention and in the appended drawings.

Short description of the drawings

The invention will be described more in detail below with reference to the appended drawings, in which

Figure 1 shows a plane cardboard blank for a carrier for cans according to an embodiment of the invention, said carrier being adapted for two rows of cans with six cans,

Figure 2 shows in a perspective view a package assembly comprising a carrier with six cans, the carrier being produced from the cardboard blank of Figure 1,

Figure 3 shows a sectional view of the package assembly of Figure 2 along the line III-III in Figure 2,

Figure 4 shows a sectional view of the package assembly of Figure 2 along the line IV-IV in Figure 2, and

Figure 5 shows a plane cardboard blank for a carrier for cans according to a second embodiment of the invention, said carrier being adapted for two rows of cans with four cans.

Detailed description of embodiments of the invention

The carrier according to the invention is produced from a plane blank of cardboard, preferably corrugated cardboard. A thin and compact F-flute corrugated cardboard is preferably used. However, a thicker E-flute corrugated cardboard may also constitute a suitable material in the carrier. In order to minimise the humidity effect on the material, the corrugated cardboard may be coated with a plastic layer, preferably on its inner side. Besides that the plastic layer increases the resistance of the material against moisture, the layer also increases the ductility of the material. The advantages of the environment friendly corrugated

cardboard remain also with a plastic coating, since the plastic material in the coated layer may be recycled.

Figure 1 shows the plane cardboard blank 32 for a carrier according to an embodiment of the invention. The carrier is adapted to connect and hold a plurality of cans 4 disposed in two rows, as shown in Figure 2. The blank 32, in the embodiment as shown adapted for six cans 4, is shown in the assembled state in Figures 2 - 4. The cans 4, which do not form part of the present invention, are conventionally designed with an essentially circular-cylindrical basic form. The upper part of the can is slightly inclined and is closed by a top closure 6 which is sealed by means of a projecting circular rim 8.

The plane blank 32 has an essentially rectangular basic form, preferably with dented or inclined corners 10, for reducing the risk that a projecting part of the carrier may get caught by an adjacent element, such as for example another package assembly. At least two gripping recesses 42 are centrally disposed in the blank between the rows of cans 4. In the embodiment as shown, the gripping recesses 42 are formed as oval openings and provide a secure finger grip for two fingers to lift and handle the package assembly. The gripping recesses 42 may, however, be circular or be formed differently and may be provided with a foldable flap 43, as shown in Figure 1. The foldable flaps 43 are adapted to be folded backwards between the cans in order to provide a reinforced and fingergrip-friendly lifting edge in the gripping recess 42. In Figure 2, the foldable flaps 43 have been folded back underneath the carrier between the cans.

Two mutually opposing and essentially arcuate slits 44, 45 are disposed in the blank 32 for each can 4 to be connected by the carrier 31. Each pair of slits comprises an outer slit 44, preferably having a first configuration, and an inner slit 45 adjacent to a centre line 34 between the rows of cans, having a second configuration.

The outer slit 44 in each pair of slits consists of an arcuate intermediate section 16 having arcuate end sections 18 on both sides there-

of. Step-like portions 20 are disposed between the intermediate section 16 and the end sections 18. The arcuate end sections 18 are part circular, the radius of which is equal to or slightly larger than the radius of the projecting rim 8 of the top closure 6, such that the edge of the end sections 18 in the assembled state is in line with or projects slightly outside the edge of the shoulder 8, as shown in Figure 2. The outer edge of the slit 44 may thus, along the end sections 18, easily be displaced downwardly past the rim 8, as will be explained more in detail below.

The arcuate intermediate section 16 of the slit 44 is formed radially inside the extended arcuate end sections 18 of the slit, such that the intermediate section forms an arched edge inside the arched line formed by the extensions of the two end sections 18. The arched edge of the intermediate section 16 with its step-like end portions 20, thus forms a projecting engagement tongue 22 directed towards the centre of the blank. As mentioned above, the engagement tongue 22 is arched and may be part circular, the radius of which corresponds to the radius of the can just below the rim. The engagement tongue 22 may also be differently arched, for example, the arc may be part circular and "wider". This engagement tongue 22 has a larger radius and a centre which does not coincide with the centre of the cans in the assembled state of the carrier. The engagement tongue is adapted to snap in below the projecting rim 8 of the can 4 to connect and lock the can to the carrier, as will be described further below.

The inner slit 45 differs from the outer slit 44, primarily in the design of the intermediate section 46, but also in that the arcuate end sections 48 are smaller than the corresponding end sections 18 in the outer slit 44. As a consequence, the intermediate section 46 of the inner slit is larger than the corresponding intermediate section 16 in the outer slit 44.

The intermediate section 46 of the inner slit 45 has at least one, in the embodiment as shown two, radially extending incisions 47. The incisions 47 extend between the edge of the slit 45 and an arcuate folding

line 53, extending between the end sections 48 and delimiting an engagement tongue between the step-like portions 50. The incisions 47 divide the engagement tongue into three engagement flaps 52. The curvature of the intermediate section 46 of the slit 45 differs from the curvature of the arcuate folding line 53 in that it is wider and has a larger radius that the folding line 53. As a consequence, the height of the engagement flaps 52 varies, such that it is higher in the centre of the engagement tongue and decreases continuously towards the ends of the engagement tongue, as shown in Figure 1. The arcuate folding line 53 is configured to correspond with the curvature of the contact line on the inclined surface of the can, as will be described more in detail below with reference to Figures 2 - 4.

As shown in Figure 1, a plurality of additional folding lines are disposed in the blank 32. Three longitudinal folding lines 54, for each row of cans, extend parallel to the long sides 56 of the blank and to the rows of the cans. Two of the three longitudinal folding lines 54 connect the ends of the arcuate slits 44, 45 with each other or with an adjacent short side 58 of the blank and the third folding line 54 connects the step-like portions 20 in the outer slits 44 with each other or with an adjacent short side 58 of the blank. In addition, a plurality of folding lines 55 are disposed in the centre portions of the blank, said folding lines in the embodiment as shown being oblique and are disposed between the rows of cans in the blank. The oblique folding lines 55 connect the outer engagement flaps 52 with an adjacent gripping recess 42 or with an adjacent short side 58 of the blank. Portions 62, 64 of the plane blank are formed between the oblique folding lines 55, the arcuate folding lines 53 and the gripping recesses 42 or the side edges 58 of the blank. A width b, see Figure 1, of said portions 62, 64, extending between a pair of adjacent arcuate folding lines 53, is slightly larger than a spacing a, see Figure 3, extending between the contact lines of the adjacent arcuate folding lines 53 on the inclined surfaces of the cans in the assembled state of the carrier, as will be described more in detail below.

The plane blank 32, in the preferred embodiment made of corrugated cardboard, is punched out of the corrugated material such that the direction of the flutes of the corrugated material (marked with a double arrow 65 in Figure 1) coincides with the direction of the engagement tongues 22, 52. Through this orientation of the flutes, the engagement tongues may withstand a maximum of compressive force.

The outer dimensions of the plane blank 32, i.e. the length and the width of the blank, are chosen such that the side edges of the assembled carrier, with its side panels 60 being folded towards the inclined surfaces of the cans, do not exceed the maximum outer dimensions of the group of cans. As a consequence, the risk of an unintentional disengagement of the carrier from the cans due to upwardly directed forces on the side panels or other parts of the blank, is considerably reduced.

The plurality of cans 4, disposed in two rows, are connected and held together by the carrier 31 in a package assembly, as shown in Figures 2 - 4. In forming the carrier as shown in Figure 2 from the plane blank 32 of Figure 1, the plane blank is first superimposed on the group of cans. The essentially circular portions of the blank disposed between the opposing slits 44, 45 bear on and cover the top closures 6, such that the slits 44, 45 in the blank on the whole coincide with the projecting rim of the can. Then, pressure is applied against the plane blank.

Pressure is first applied against the side panels 60 on the outer sides of the group of cans, said panels being forced in a downward direction. Through the downwardly directed pressure, the blank 32 is folded in the folding lines 54. The side panels 60 are thus folded in two steps in the parallel folding lines 54 towards the inclined surface on the upper part of the cans 4, as shown in Figure 3. The arcuate end sections 18 of the outer slits 44 are displaced in a downward direction past the rim 8 of the can and the projecting engagement tongue 22 is turned slightly upwards. Hence, the arcuate end sections of the slit 44 pass outside the projecting rim 8 and the engagement tongue 22 slips over

and snaps in below the rim 8, to connect and lock the carrier to the cans. The arcuate engagement tongue 22 is formed to fit the cylindrical curvature of the can 4, such that the entire tongue 22 bears on the surface of the can below the rim 8 and exerts a tightening force ensuing from tensions distributed in the carrier along the outer edges of the end sections 18 of the slits from the contact pressure of the carrier 1 on the top closure 6, such that a secure and stable connection between the carrier and the cans is achieved.

As shown in Figure 2, the upper plane parts of the assembled carrier, cover the upper portions of the cans 4, i.e. the top closures 6, such that these portions are protected from contamination during transportation and storing.

In a subsequent assembly step, preferably a special pressure-applying tool with individually spring-loaded rolls, applies pressure in the the centre 34 of the blank, especially in the portions 62, 64. The pressure is preferably applied at certain points in the blank, however with a certain longitudinal extension, forcing the portions 62, 64 in a downward direction. Through the pressure, the blank is folded in the longitudinal inner folding lines 54, such that the outer edges of the inner slits 45 are displaced downwardly past the rim 8 of the can. In addition, the blank 32 is folded in the oblique folding lines 55 and in the arcuate folding lines 53. The downward pressure is applied, such that the arcuate folding lines 53 are forced against the inclined surfaces of the cans, and the engagement flaps 52 are folded upwards and snap in below the rim 8 of the can into a locking position. The downward pressure is applied in central portions 62, 64 between the pairs of cans, thus forming bowl-shaped indentations 66, 68 between the oblique folding lines 55 and the arcuate folding lines 53. Figure 4 shows that the bottom level of each bowl-shaped indentation 66, 68 is formed centrally between each pair of cans and that the top level of the bowl is formed at the edge of the gripping recesses 42. The level of the bowl-shaped indentation 68 at the edge of the carrier 31 is slightly lower than the top

level at the edge of the gripping recess 42. The bowl-shaped indentations 66, 68 are obtained by means of the oversized width b in the central portions 62, 64 of the blank and the declining height of the engagement tongue towards its ends and also the oblique folding lines 55. In this assembly step, i.e. when the bowl-shaped indentations 66, 68 are formed, the spacing between the outer slits 44 in the carrier is slightly reduced. As a result, the pressure of the engagement tongues 22 on the rim 8 are increased by means of the tightening forces from the central portions 62, 64. From this assembly step, the cans 4 are held and supported in the package assembly in a steady and secure engagement by the carrier.

When the carrier 31 of Figure 2, with its heavy load of liquid-filled cans 4, is lifted by a two finger grip in the gripping recesses 42, the lifting force L is applied in the carrier between the rows of cans 4. Through the bowl-shaped indentations 66, 68 in the portions 62, 64 between the rows of cans 4, a stiffening of the central portions of the carrier is obtained. The stiffening of the central portions of the carrier prevents that these portions are forced upwardly by the upwardly directed lifting forces L, such that the tongues would be disengaged from the cans. Unlike the carriers of the prior art, in which the lifting forces tend to disengage the carrier from the cans, the lifting forces L in the carrier according to the invention are partly transformed to forces F tending to press the cans together (see Figures 3 and 4) and partly the lifting forces L in the gripping recesses 42 are distributed in the direction of the oblique folding lines 55 and are transformed to an increased pressure of the engagement flaps 52 on the rim 8, such that the cans are held steadily by the carrier and are securely connected by the carrier. The bowl-shaped indentations, the gripping recesses provided centrally between the rows of cans and the projecting arcuate engagement tongues in the carrier according to the invention, contribute to a secure and steady connection of the cans, a stiffening of the assembled carrier and a transformation of the lifting forces to an increased engagement pressure, an

increased tightening of the carrier and a reduced tendency of movements of the cans in the carrier.

Figure 5 shows a second exemplifying embodiment of a cardboard blank for a carrier for four cans in two rows of cans. Opposing pair of slits 44, 45 in the blank for each can to be connected by the carrier and folding lines are disposed in a corresponding manner as in the blank as shown in Figure 1. Two gripping recesses 42 are disposed in the blank. One gripping recess 42 is formed as an oval opening with a foldable flap 43 and is disposed centrally in the blank between the rows of cans. The other gripping recess 42 is disposed centrally in the edge of the blank and is formed as an open recess with a foldable flap 43. In a third embodiment of the invention (not shown in the drawings) the blank is adapted for two cans arranged in two rows, as in Figures 1 and 5. In this embodiment, there are two gripping recesses, both of which are centrally disposed in opposing edges of the blank and are formed as open recesses, similar to the gripping recesses 42 of Figure 5.

According to the invention, the blanks may effectively be assembled on the cans in an automated production line. The blanks may however also effectively be assembled in a semi-automated line or in a packaging line and it is also convenient to assemble the blank manually into a package assembly.

It will be understood that the invention is not restricted to the aforedescribed exemplifying embodiments thereof and that several conceivable modifications of the invention are possible within the scope of the following claims.

CLAIMS

1. A carrier of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans (4), being disposed in at least two rows and having an inclined upper part and a top closure (6) with a projecting circular rim (8), said carrier (31) being produced from a plane blank (32), having, for each can to be connected by the carrier, two mutually opposing, essentially arcuate slits (44, 45), the outer edges of which engage below the rim (8) of the cans when the carrier is assembled on the plurality of cans to connect the carrier and the cans and form a package assembly,

characterised in that gripping recesses (42), adapted to be gripped by fingers to lift and handle the package assembly, are centrally disposed in the carrier blank (32) between the rows of cans (4), and that a bowl-shaped indentation (66) is formed centrally in the carrier (31) between said gripping recesses (42) and the rows of cans (4).

2. A carrier according to claim 1, **characterised** in that bowl-shaped indentations (68) are formed centrally in the carrier (31) between a gripping recess (42) and a side (58) of the carrier blank (32) and between the rows of cans (4).

3. A carrier according to claim 2, **characterised** in that said arcuate slits (44, 45) comprise an arcuate intermediate section (16; 46) and two arcuate end sections (18; 48) on each side thereof, said intermediate section (16; 46) being formed radially inside the extended arcuate end sections (18; 48).

4. A carrier according to claim 3, **characterised** in that said intermediate section (16; 46) forms an inwardly projecting arcuate engagement tongue (22; 52) between the end sections (18; 48), said tongue being adapted to abut on and engage below the rim (8) of the can to

connect the carrier (1; 31) and the cans (4) in the assembled state of the carrier.

5. A carrier according to claim 4, **characterised** in that oblique folding lines (55) are disposed in the carrier blank (32) between the rows of cans (4), said oblique folding lines (55) connecting the outer portions of each engagement tongue (52) in the inner arcuate slits (45) with an adjacent gripping recess (42) or with an adjacent side (58) of the blank (32).

6. A carrier according to claim 5, **characterised** in that the arcuate end sections (18; 48) of the inner and outer slits (44, 45) are circular, having a radius which is equal to or slightly larger than the radius of the circular rim (8) of the can and that the inner arcuate slit (45) in each pair of opposing slits (44, 45) has an arcuate intermediate section (46) with a radius which is larger than the radius of the arcuate end sections (48).

7. A carrier according to claim 6, **characterised** in that the arcuate intermediate section (46) of said inner slit (45) forms a projecting engagement tongue (52, 52, 52), which is radially delimited by an arcuate folding line (53) extending between the end sections (48) of the slit (45) and which is divided by radially extending incisions (47) into at least two engagement flaps (52), said flaps (52) being adapted to be folded upwardly to bear on the inclined surface of the can (4) and to engage below the rim (8) of the can, when the carrier (31) is assembled on the cans (4).

8. A carrier according to claim 7, **characterised** in that the height of the engagement tongue of the inner slit (45) has its maximum in the centre of the tongue and decreases towards the ends of the tongue.

9. A carrier according to claim 8, **characterised** in that said oblique folding lines (55) extend between each outermost engagement flap (52) and an adjacent gripping recess (42) or an adjacent side (58) of the blank.

10. A carrier according to claim 9, **characterised** in that folding lines (54) are provided in the carrier blank (32) extending parallel with the sides (56) of the blank and with the rows of cans (4), said folding lines (54) connecting the ends of the arcuate slits (44, 45) with each other or with an adjacent side of the blank (32).

11. A carrier according to claim 10, **characterised** in that additional folding lines (54) are provided in the carrier blank (32) extending parallel with the sides (56) of the blank and with the rows of cans (4), said additional folding lines (54) connecting step-like portions (20), between the intermediate section (16) and the end sections (18) in the outer slits (44), with each other or with an adjacent side (58) of the blank, forming outer foldable side panels (60) along the rows of cans (4).

12. A carrier according to any one of the proceeding claims, **characterised** in that at least two gripping recesses (42) are provided between the rows of cans (4).

13. A carrier according to claim 12, **characterised** in that said gripping recesses (42) are formed as circular or oval openings in the carrier blank (32).

14. A plane blank of cardboard, preferably corrugated cardboard, said blank being adapted to be assembled as a carrier (31) according to any one of claims 1 - 13.

15. A method to assemble a plane blank (32) of cardboard, preferably corrugated cardboard, as a carrier (31) on a plurality of generally cylindrical cans (4), being disposed in at least two rows and having an inclined upper part and a top closure (6) with a projecting circular rim (8), said plane blank (32) comprising, for each can to be connected by the carrier, two mutually opposing, essentially arcuate slits (44, 45), the outer edges of which are intended to engage below the rim (8) of the cans when the carrier is assembled on the plurality of cans to connect the carrier and the cans and form a package assembly,

characterised in

that the plane blank (32) is superimposed on the plurality of cans (4),

that pressure is applied against two opposing side panels (60) on the blank (32), such that said panels are folded and the outer edges of the outer slits (44) are displaced downwardly to engage below the rim (8) of the cans (4), and

that pressure is applied against the central portion (62, 64) of the blank (32) between the rows of cans (4), such that the outer edges of the inner slits (45) are displaced downwardly to engage below the rim (8) of the cans (4) and such that a central portion (62) between the rows of cans (4) is forming a bowl-shaped indentation (66).

16. A method according to claim 15, **characterised** in that pressure is applied against the central portion (62, 64) of the blank (32) between the rows of cans (4), such that pressure is applied at certain central portions (62, 64) between each pair of cans (4) forming a bowl-shaped indentation (66, 68) between each pair of cans.

17. A method according to claim 16, **characterised** in that pressure is applied against the central portion (62, 64) of the blank (32) between the rows of cans (4) at certain central portions (62, 64), such that the blank (32) is folded in longitudinal folding lines (54) extending

between the ends of the inner slits (45) or an adjacent side (48) of the blank and also in oblique folding lines (55) in the central portion of the blank.

18. A method according to claim 17, **characterised** in that pressure is applied against the central portion (62, 64) of the blank (32) between the rows of cans (4), such that pressure is applied at each central portion (62, 64) of the blank which is delimited by the oblique folding lines (55), gripping recesses (42), centrally disposed in the blank or a side (48) edge of the blank, and arcuate folding lines (53), radially delimiting an engagement tongue (52, 52, 52) formed in the inner slit (45).

19. A method according to claim 18, **characterised** in that pressure is applied against the central portion (62, 64) of the blank (32) between the rows of cans (4), such that the arcuate folding lines (53) are pressed against the inclined surface of the cans (4) and the engagement tongues (52, 52, 52) are being folded upwardly to engage below the rim (8) of the can.

20. A method according to claim 19, **characterised** in that the pressure that is applied against the central portion (62, 64) between the rows of cans (4) is applied by means of a pressure-applying tool with spring-loaded rolls.

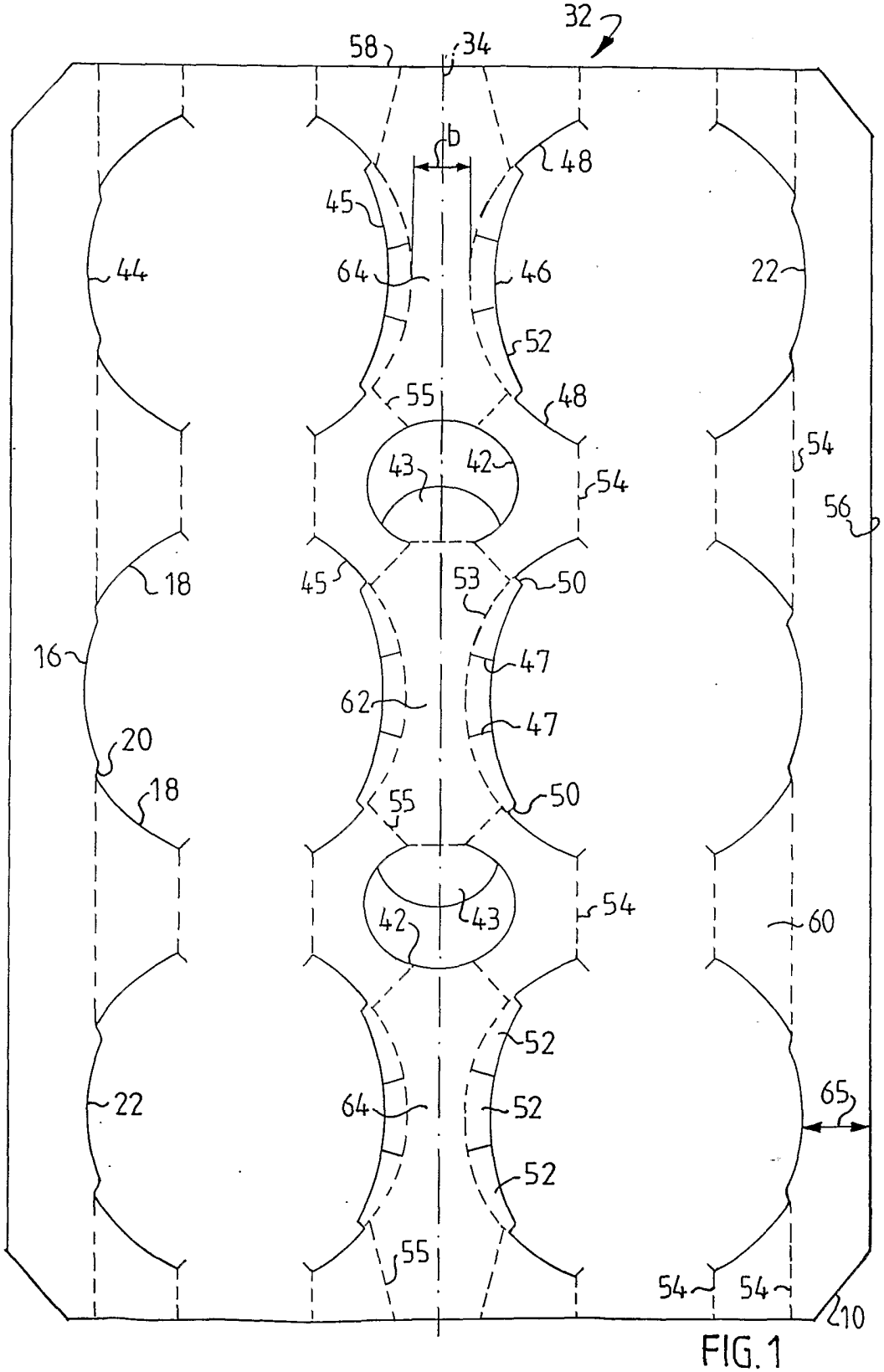

32
58
34
b
48
45
44
64
46
22
52
55
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43
42
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56
18
45
53
50
16
47
62
47
20
18
55
50
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42
43
60
52
22
64
52
65
52
55
54
54
10

FIG. 1

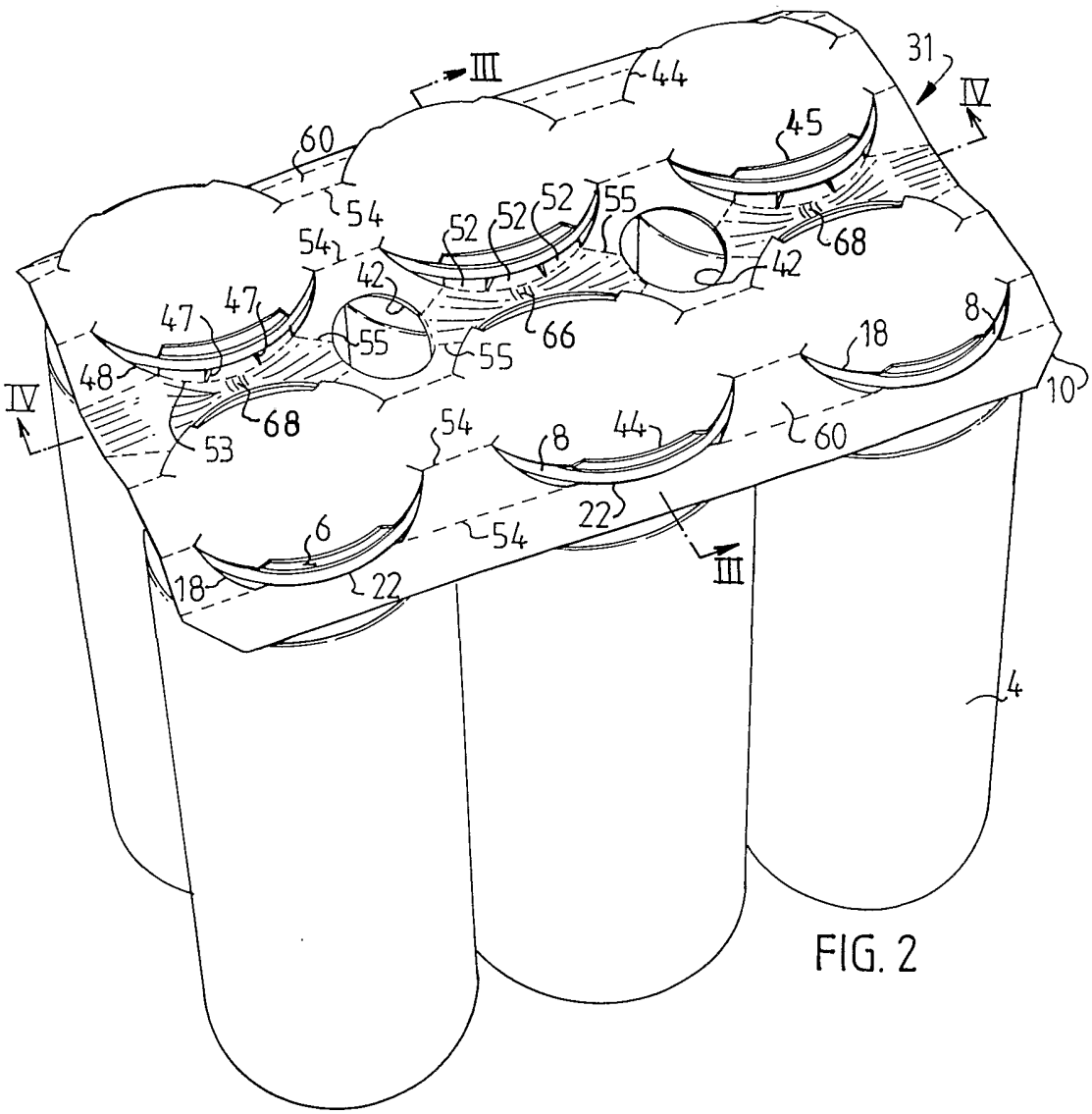

III
44
31
IV
60
45
54
52
52
52
55
54
42
42
68
47
47
55
55
66
18
8
48
IV
68
53
54
8
44
60
10
6
54
22
III
18
22
4

FIG. 2

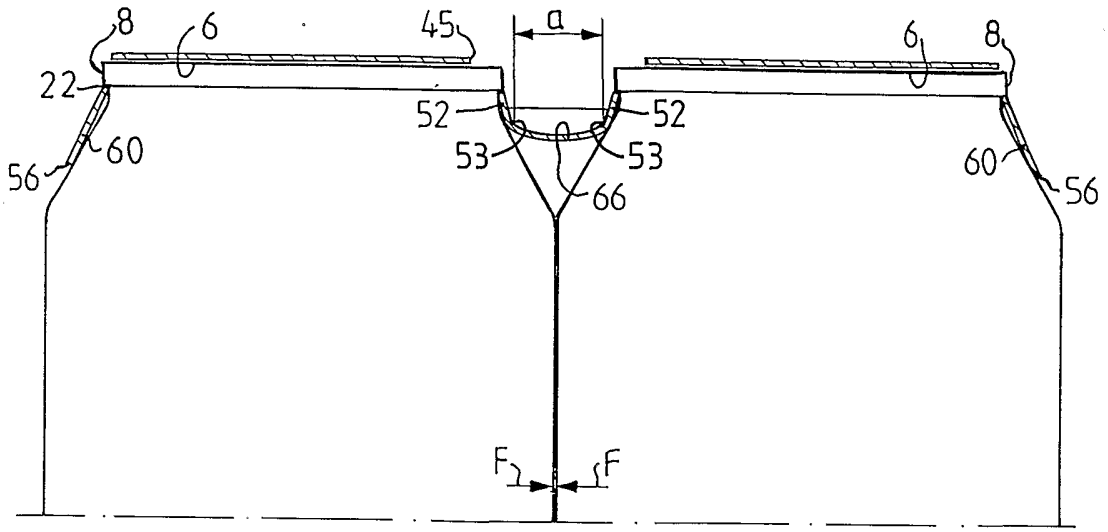

8
6
45
a
6
8
22
52
52
53
53
60
56
66
60
56
F
F

FIG. 3

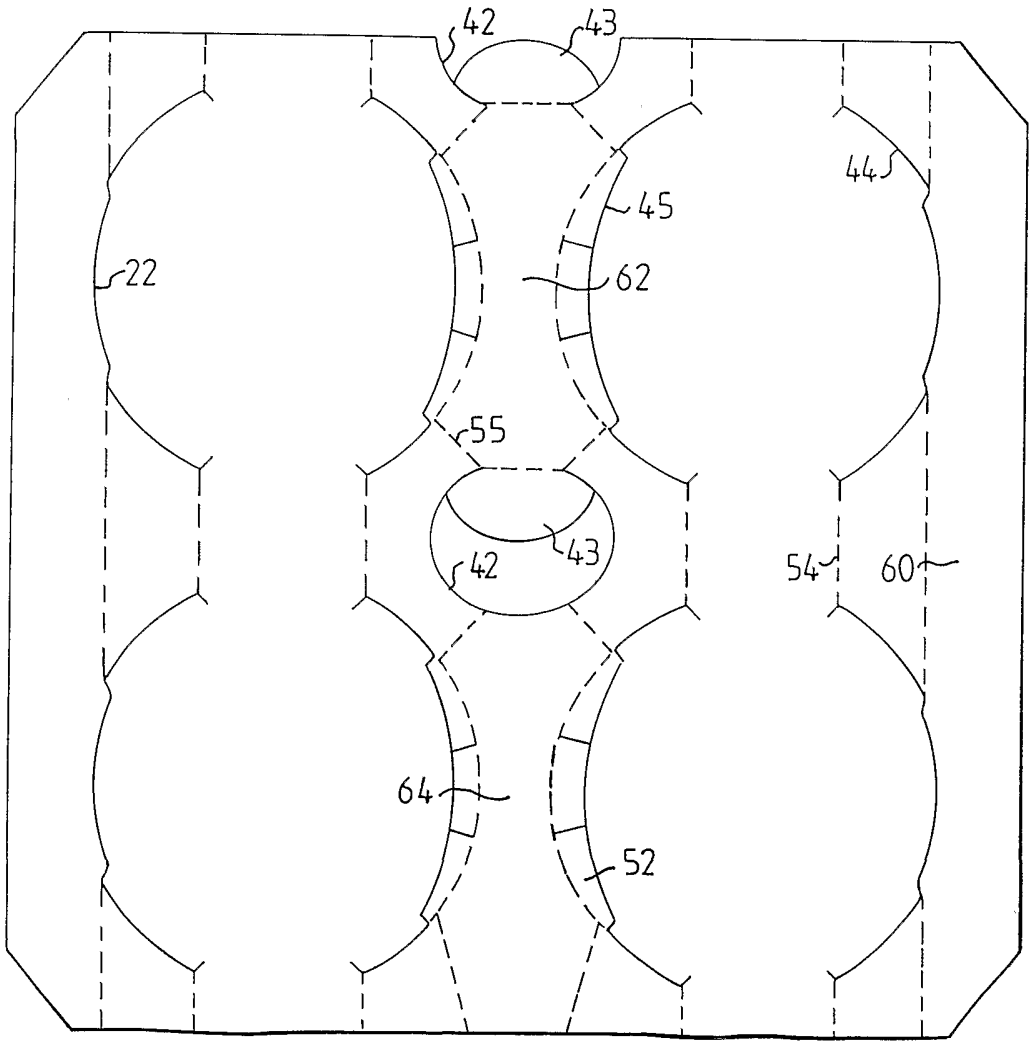

42
43
44
45
22
62
55
43
42
54
60
64
52

FIG. 5

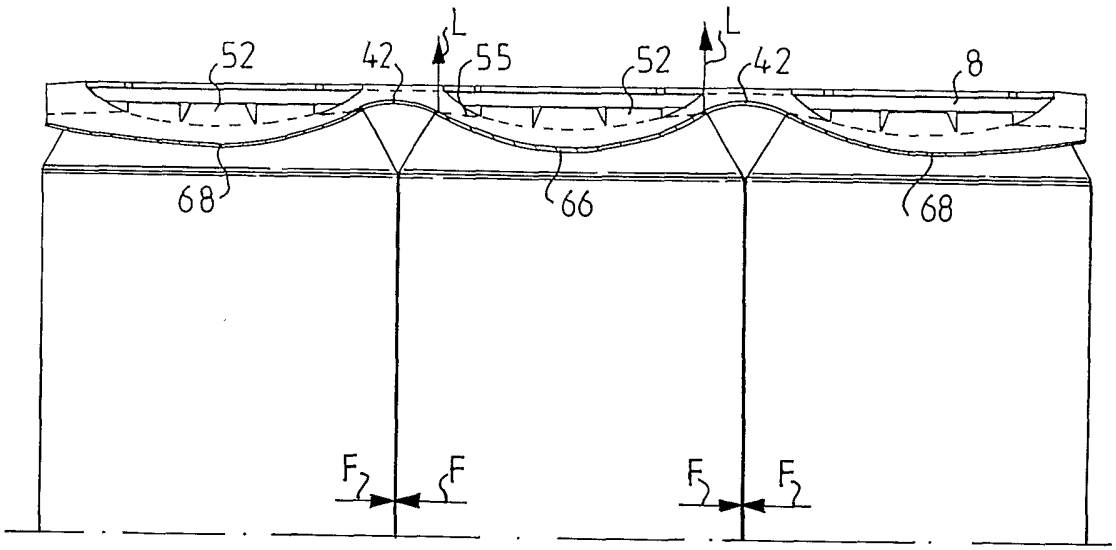


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 02/01318

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 71/42
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5443153 A (ROBERT L. SUTHERLAND), 22 August 1995 (22.08.95), column 2, line 28 - column 3, line 41, figures 1,3 --	1-20
A	US 3194476 A (A.J. WEISS), 13 July 1965 (13.07.65), column 2, line 39 - column 3, line 4 --	1-20
A	US 5355999 A (ROBERT L. SUTHERLAND), 18 October 1994 (18.10.94), column 2, line 43 - column 3, line 55 --	1-20
A	US 5469687 A (ALLEN L. OLSON), 28 November 1995 (28.11.95), column 6, line 45 - column 9, line 52 --	1-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 November 2002	12 -11- 2002
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Anette Hall/Els Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 02/01318

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US 5469687 A	28/11/95	NONE	