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(54) **CARRIER FOR CANS AND A CARBOARD BLANK FOR A CARRIER FOR CANS**

(57) **ABSTRACT**

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The present invention relates to a carrier for cans made of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans (4), being disposed in one or several rows and having an inclined upper part and a top closure (6) with a circular projecting rim (8). The carrier (1; 31) is produced from a plane blank (2; 32), having, for each can to be connected by the carrier, two mutually opposing, essentially arcuate slits (14; 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. The essentially arcuate slits (14; 44, 45) comprise an arcuate intermediate section (16; 46) and arcuate end sections (18; 48) on both sides thereof, said intermediate section (16; 46) being formed radially inside the extended arcuate end sections (18; 48), such that an inward projecting engagement tongue (22; 52) is formed between the end sections (18; 48). The tongue is adapted to abut on and engage below the rim (8) to connect the carrier (1; 31) and the cans (4) to a package assembly. The invention also relates to a plane blank of cardboard for a carrier of cans.

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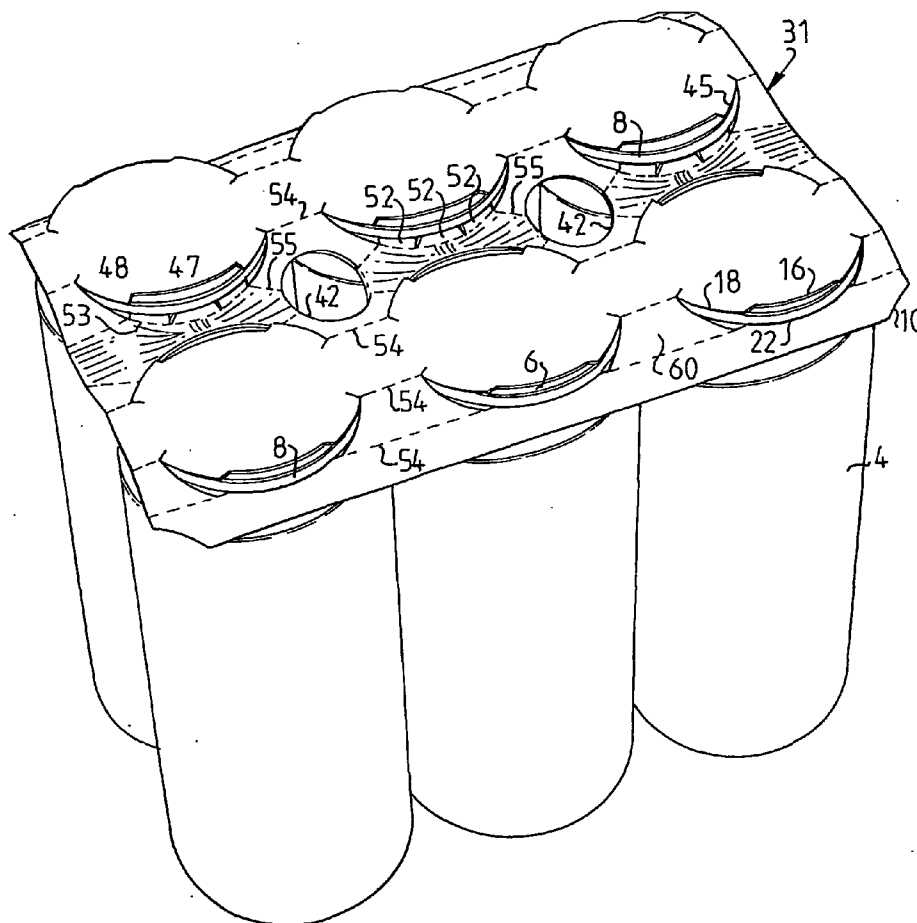
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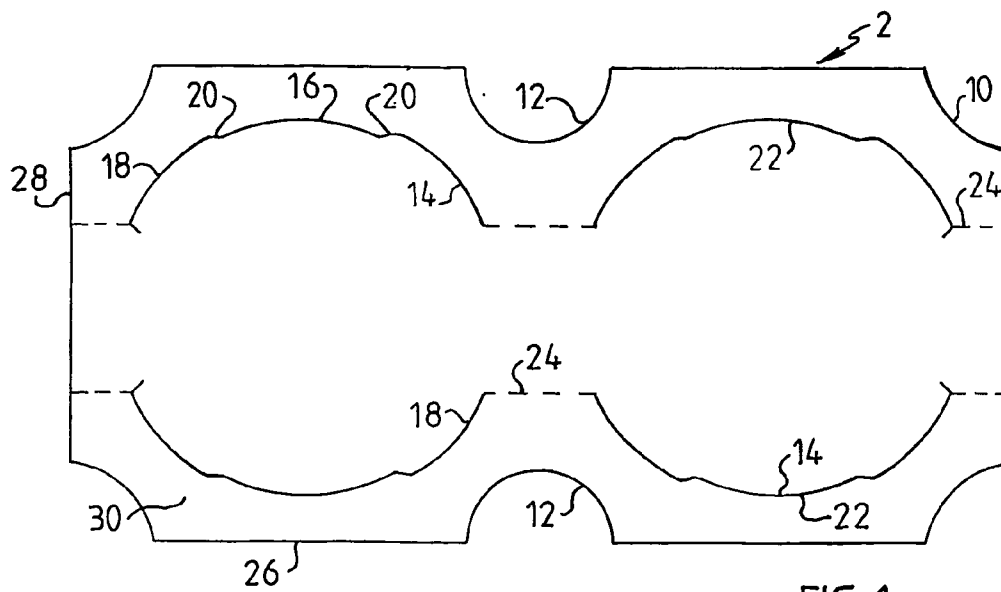


FIG. 1

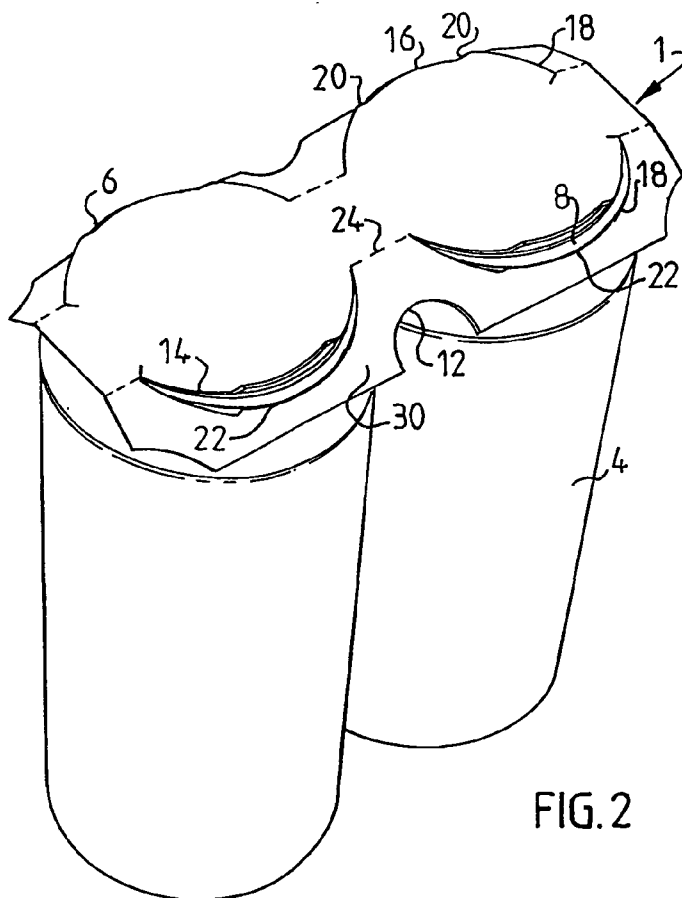


FIG. 2

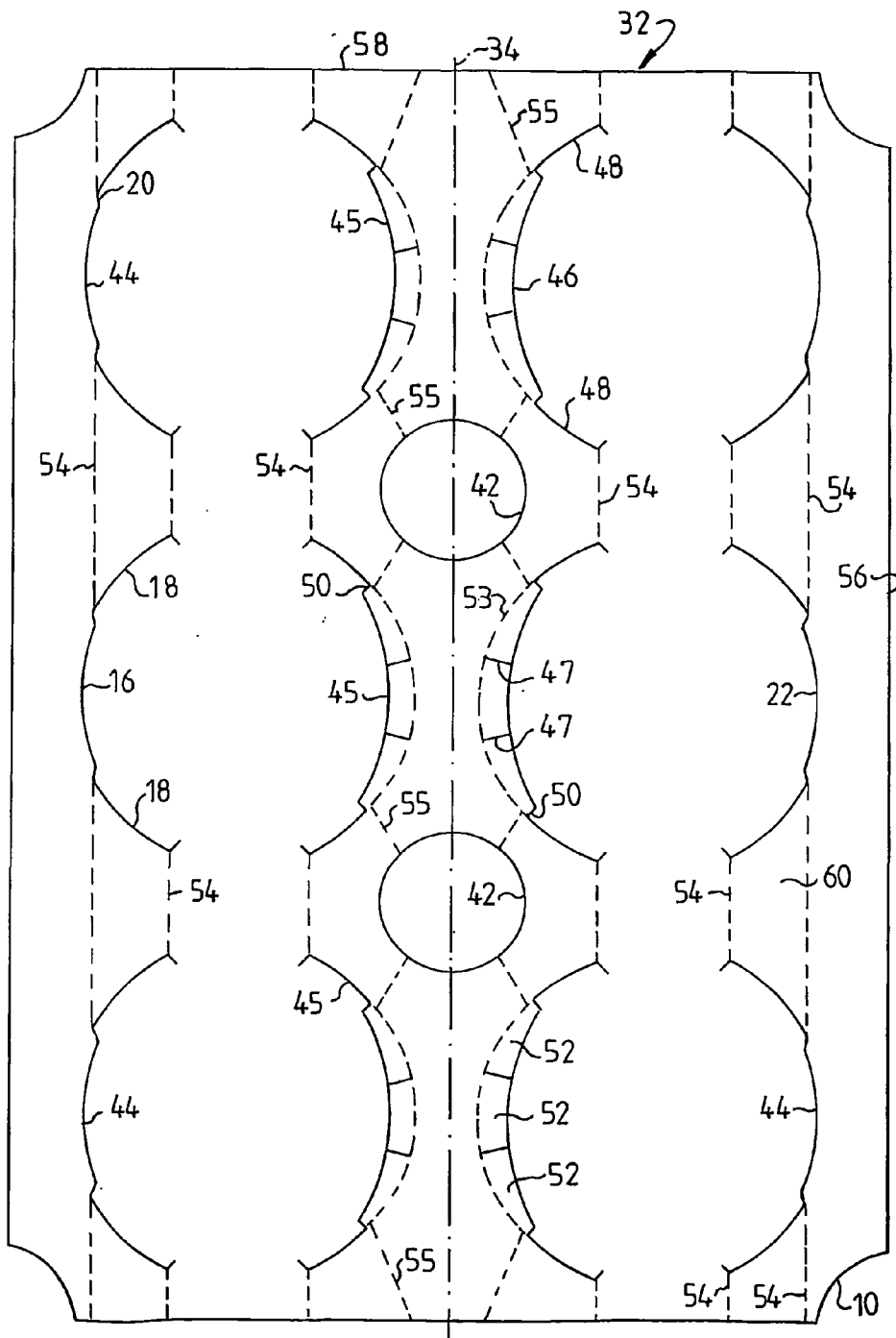
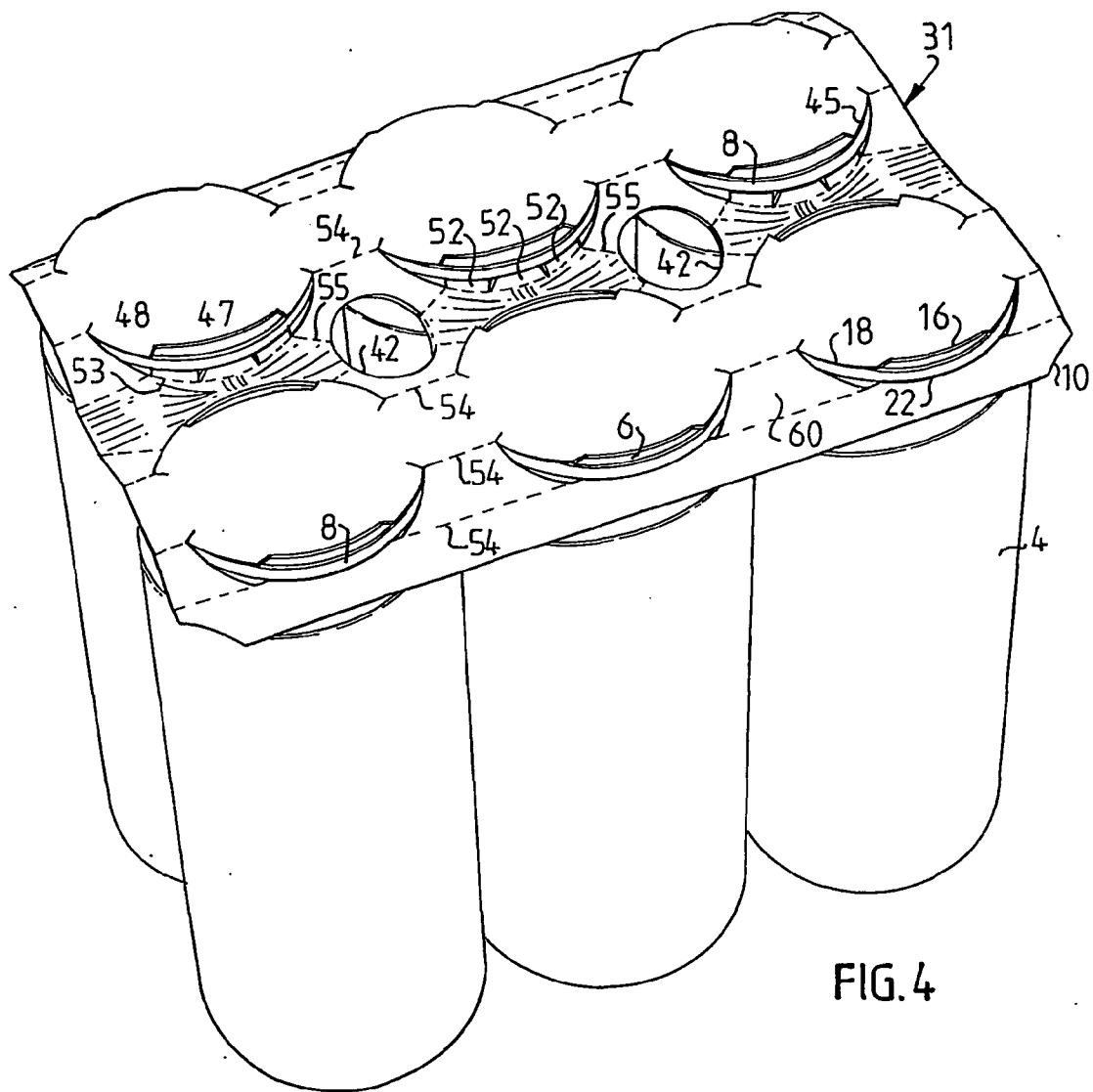


FIG. 3



CARRIER FOR CANS AND A CARBOARD BLANK FOR A CARRIER FOR CANS

FIELD OF THE INVENTION

[0001] The present invention relates to a carrier of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans being disposed in one or several 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 to be 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.

[0002] The invention also relates to a plane blank of cardboard for a carrier for cans.

BACKGROUND OF THE INVENTION

[0003] Cylindrical cans are used in the beverage industries for drinks, such as for instance mineral water, beer 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.

[0004] 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.

[0005] 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.

[0006] 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 U.S. Pat. No. 3,194,476. This wrap-around carrier is costly and also 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.

[0007] 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 U.S. Pat. No. 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 down-

wardly 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.

[0008] 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 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

[0009] The object of the present invention is to solve the above-mentioned problems by providing a carrier for cans, 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.

[0010] This object is achieved in accordance with the invention in a carrier for cans and a cardboard blank for a carrier for cans as described above and with the characterizing features as defined in the appended claims.

[0011] According to the invention, the opposing arcuate slits for each can to be connected by the carrier, comprise an arcuate intermediate section between two arcuate end sections, said intermediate section of the slit being formed radially inside the arcuate end sections of the slit, such that a radially projecting arcuate engagement tongue is formed in the intermediate section of the slit. The tongue is adapted to slip over the rim of the can when the side panels and possibly the centre portion of the blank are forced in a downward direction towards the inclined sides of the can, and to snap in below the rim of the can to securely connect the carrier to the cans. The can is securely tightened in the carrier by the tightening forces ensuing from the contact pressure of the carrier on the top closure of the can arising when the engagement tongue snaps in below and bears on the rim of the can. 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 in these sections effected by the contact pressure on the top closure, the engagement tongues are tightened and provides a secure and steady connection.

[0012] 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

[0013] The invention will be described more in detail below with reference to the appended drawings, in which

[0014] **FIG. 1** shows a plane cardboard blank for a carrier for cans according to a first embodiment of the invention, said carrier being adapted for one row of cans with two cans,

[0015] **FIG. 2** shows in a perspective view a package assembly comprising a carrier with two cans, the carrier being produced from the cardboard blank of **FIG. 1**,

[0016] **FIG. 3** 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 six cans, and

[0017] **FIG. 4** shows in a perspective view a package assembly comprising a carrier with six cans, the carrier being produced from the cardboard blank of **FIG. 3**.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0018] 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.

[0019] **FIG. 1** shows the plane blank **2** for a carrier according to a first preferred embodiment of the invention. The carrier is adapted to hold and connect a plurality of cans disposed in a single row, in the embodiment as shown, a row of two cans. **FIG. 2** shows the carrier **1** produced from the blank **2** of **FIG. 1** and assembled on the plurality of cans **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 circular projecting rim **8**.

[0020] The plane blank **2** in **FIG. 1** 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 of cans. Two centrally disposed gripping recesses **12**, forming a finger grip for two fingers, are provided on the long sides **26** of the blank. The

carrier **1** and the cans **4**, forming a package assembly as shown in **FIG. 2**, may simply be lifted by a two finger grip in the recesses **12**.

[0021] Two mutually opposing and essentially arcuate slits **14** are disposed in the blank **2** for each can **4** to be connected by the carrier. The arcuate slit **14** comprises an arcuate intermediate section **16** having arcuate end sections **18** on both sides thereof. 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** on the can, such that the end sections **18** are in line with or project slightly outside the edge of the shoulder **8** in the assembled state as shown in **FIG. 2**. The outer edge of the slit **14** may thus, along the end sections **18**, easily be displaced downwardly past the rim **8**, as will be explained more in detail below.

[0022] The arcuate intermediate section **16** of the slit **14** is formed radially inside the arcuate end sections **18** of the slit, such that the intermediate section forms an arc inside the arched line formed by the extensions of the two end sections **18**. The outer edge of the intermediate section **16** of the slit **14**, 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 curvature of which corresponding to the curvature 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". Hence, 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 **22** 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 more in detail below.

[0023] Several longitudinal folding lines **24** are disposed in the blank **2**, extending parallel with the long sides **26** of the blank and the row of cans. The folding lines **24** connect the ends of the arcuate slits **14** with each other or with an adjacent short side **28** of the blank.

[0024] In forming the carrier **1** as shown in **FIG. 2** from the plane blank **2** of **FIG. 1**, the blank **2** is first superimposed on the top closures **6** of the cans, such that the slits **14** in the blank on the whole coincide with the projecting rims **8** of the cans. Side panels **30** in the blank **2**, formed between the long sides **26** and the folding lines **24**, are forced and thus folded downwardly towards the inclined surfaces of the cans. The outer edge of the slit **14** is thereby displaced downwardly and the projecting engagement tongue **22** is turned into a slightly upward direction. Hence, the arcuate end sections **18** of the slit **14** pass the outside of the projecting rim **8** of the top closure **6** and the engagement tongue **22** slips over the rim **8** and snaps in below said rim, such that the carrier is securely locked to the can by the tongue.

[0025] 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. The package assembly is further stabilised by the panels **30** bearing on the inclined surfaces of the cans **4**.

[0026] The width (along the short sides 28) of the plane blank 2 is approximately equal to the cylindrical diameter of the cans. In the assembled state, with the side panels 30 in an inclined position, the width of the carrier 1 is further reduced. Hence, in the assembled state, the edges of the carrier 1 do not exceed the maximum dimensions of the 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, is considerably reduced. The upper plane parts of the assembled carrier 1, cover the upper portions of the cans, i.e. the top closure 6, such that these portions are protected from contamination during transportation and storing.

[0027] FIG. 3 shows the plane cardboard blank 32 for a carrier according to a second embodiment of the invention. The blank is adapted, in the assembled state, to connect and hold a plurality, i.e. six in the embodiment as shown, of cans 4 arranged in two rows. The blank 32 is shown in an assembled state in FIG. 4. The plane blank 32 has an essentially rectangular basic form, preferably with dented or inclined corners 10 as in the embodiment as shown in FIGS. 1-2. At least two gripping recesses 42, preferably configured as circular or oval openings, are centrally disposed in the blank between the rows of cans, forming a finger grip for two fingers in order to lift and handle the package assembly.

[0028] 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, corresponding in substance with the slits 14 in the embodiment as shown in FIGS. 1 and 2, and an inner slit 45 adjacent to the centre 34 of the blank between the rows of cans. The inner slit 45 differs from the outer slit 44, primarily in the configuration 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.

[0029] 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 than the folding line 53. The arcuate folding line 53 has a curvature corresponding to the curvature of the contact line on the inclined surface of the can, as will be described more in detail below with reference to FIG. 4.

[0030] As shown in FIG. 3, 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 the rows of 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 oblique folding lines 55 are disposed in the

blank, said folding lines connecting the outer engagement flaps 52 with an adjacent gripping recess 42 or with an adjacent short side of the blank.

[0031] 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 FIG. 4. In forming the carrier as shown in FIG. 4 from the plane blank 32 of FIG. 3, the plane blank is first superimposed on the rows of cans and then the side panels 60 on the long sides as well as the central portions of the blank are forced and thus folded in a downward direction, preferably by means of a specially designed pressure-applying tool. During this pressing procedure, the essentially circular parts of the blank between the slits 44, 45 bear on and cover the top closures 6 of the cans, while the side panels 60 and the central portions are forced downwardly. Through the downwardly directed pressure, the blank 32 is folded in the folding lines 54, 55. Hence, the side panels 60 are folded in two steps in the two longitudinal folding lines 54, whereby the arcuate outer edge of the outer slits 44 is displaced in a downward direction past the rim 8 of the can, in a corresponding manner as in FIG. 2. The outermost part of the side panels 60 is additionally folded, such that the engagement tongue 22 slips over the rim 8 and snaps in below said rim into its locking position.

[0032] Between the rows of cans, centrally on the blank 32, a special designed tool applies pressure at certain points along the centre line 34 of the blank. The blank 32 is folded in the longitudinal inner folding line 54, such that the outer edges of the inner slits 45 are displaced in a downward direction past the rim 8 of the can. In addition, the blank 32 is folded in the oblique folding lines 55 and 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 upwardly to finally snap in below the rim 8 of the can into a locking position. The downward pressure is applied at certain portions of the blank between each pair of cans, thus forming bowl-shaped indentations between the oblique folding lines 55 and the arcuate folding lines 53.

[0033] When the carrier 31 of FIG. 4, with its heavy load of liquid-filled cans 4, is lifted by a two finger grip in the gripping recesses 42, the oblique folding lines 55 and especially the indentations formed therebetween in the carrier 31 prevent that the lifting forces, as in other previously known carriers, are transformed to a separation of and mutual movements between the cans, which may cause a disengagement of the cans from the carrier. According to the invention, the lifting forces are instead distributed in the direction of the oblique folding lines 55 and is transformed into an increased pressure of the engagement flaps 52 against the rim 8.

[0034] 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.

[0035] It will be understood that the invention is not restricted to the aforescribed exemplifying embodiments thereof and that several conceivable modifications of the invention are possible within the scope of the following claims.

1. A carrier of cardboard, preferably corrugated cardboard, for connecting a plurality of generally cylindrical cans (4), being disposed in one or several rows and having an inclined upper part and a top closure (6) with a circular projecting rim (8), said carrier (1; 31) being produced from a plane blank (2; 32), having, for each can to be connected by the carrier, two mutually opposing, essentially arcuate slits (14; 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,

characterized in

that the essentially arcuate slits (14; 44, 45) comprise an arcuate intermediate section (16; 46) and arcuate end sections (18; 48) on both sides thereof,

that the arcuate end sections (18; 48) are circular having a radius which is equal to or slightly larger than the radius of the circular rim (8), and

that said intermediate section (16; 46) being formed radially inside the extended arcuate end sections (18; 48), such that an inward projecting engagement tongue (22; 52) is formed between the end sections (18; 48), said tongue being adapted to abut and exert a tightening force on and engage below the rim (8) to connect the carrier (1; 31) and the cans (4) to a package assembly.

2. A carrier according to claim 1, characterized in that the plane blank (2; 32) is essentially rectangular and that foldable panels (30; 60) are disposed in the blank, parallel with the long sides of the blank.

3. A carrier according to claim 2, characterized in that the panels (30; 60) are foldable in folding lines (24; 54), connecting the ends of the arcuate slits (14; 44, 45) with each other or with an adjacent side (28; 58) of the blank.

4. A carrier according to claim 3, characterized in that the outer edges of the carrier are disposed in line with or inside the maximum external dimensions of the group of cans (4) in the package assembly.

5. A carrier according to claim 1, characterized in that gripping recesses (12; 42), adapted to be gripped by fingers to lift and handle the package assembly, are disposed in the carrier blank.

6. A carrier according to claim 5, characterized in that the carrier is adapted to connect two or more cans (4) in one row, and that said gripping recesses (12) are centrally arranged in the sides (26) of the blank.

7. A carrier according to claim 5, characterized in that the carrier is adapted to connect two or more cans (4) in two rows, and that said gripping recesses (42) constitute openings, preferably circular or oval, centrally disposed between the rows of cans (4).

8. A carrier according to claim 7, characterized in 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).

9. A carrier according to claim 8, characterized in that the arcuate intermediate section (46) of said inner slit (45) forms a projecting engagement tongue (52, 52, 52), which is delimited by an arcuate folding line (53) extending between the end sections (48) and is divided by radially extending incisions (47), such that at least two engagement flaps (52) are formed, said engagement 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 is assembled on the cans.

10. A carrier according to claim 9, characterized in that oblique folding lines (55) are disposed in the carrier blank (32), connecting each outermost engagement flap (52) with an adjacent gripping recess (42) or with an adjacent side (58) of the blank (32).

11. A carrier according to the claim 10, characterized in that a to folding line (54) is disposed in the carrier blank (32) extending parallel with the sides (56) of the blank and with the rows of cans, said folding line (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) in order to form an outer foldable is panel on each long side (56).

12. A plane blank of cardboard, preferably corrugated cardboard, said blank being adapted to be assembled as a carrier for cylindrical cans and having, for each can to be connected by the carrier, a pair of two mutually opposing, essentially arcuate slits (14; 44, 45), characterized in that the essentially arcuate slits (14; 44, 45) comprise an arcuate intermediate section (16; 46) and arcuate end sections (18; 48) on both sides thereof, that the arcuate end sections (18; 48) are circular having a radius which is equal to or slightly larger than the radius of the cans, and that the intermediate section (16; 46) being formed radially inside the extended arcuate end sections (18; 48), such that an inward projecting engagement tongue (22; 52) is formed between the end sections (18; 48).

13. A plane blank according to claim 12, characterized in that foldable panels (30; 60) are disposed in the blank and are foldable in folding lines (24; 54), said folding lines being parallel with the long sides of the blank and connecting the ends of the arcuate slits (14; 44, 45) with each other or with an adjacent side (28; 58) of the blank.

14. A plane blank according to claim 13, characterized in that said pairs of two mutually opposing, essentially arcuate slits (14) are arranged in one row and that gripping recesses (12) are centrally arranged in the sides (26) of the blank.

15. A plane blank according to claim 13, characterized in that to said pairs of two mutually opposing, essentially arcuate slits (44, 45) are arranged in two rows and that gripping recesses (42) are centrally arranged between said rows.

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