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(54) **CONTAINER END MANUFACTURE**

BEHÄLTERDECKEL HERSTELLUNG

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(56) References cited:
GB-A- 2 259 075 **US-A- 3 704 140**
US-A- 4 836 398 **US-A- 4 967 538**

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Description

[0001] This invention relates to a method for manufacturing can ends, and particularly to ends for cans filled with food or non-carbonated beverages.

[0002] In cans for carbonated beverages the internal pressure generated by the carbon dioxide content of the product contributes significant strength to the very thin sidewalls of the cans. In contrast, non-carbonated products are frequently hot filled into cans and when such cans are cooled an internal vacuum is developed. This dictates that the can walls should be relatively thick to withstand the vacuum without collapsing or panelling. Much effort has been devoted to methods intended to ensure that the pressure in the headspace of the can containing a non-carbonated product is maintained at a pressure significantly above atmospheric throughout its storage life, thereby facilitating the use of lightweight DWI cans for such products. Mechanical pressurisation processes have been proposed in US 4836398 and EP 0521642A. In these proposals, the can is provided with at least one deformable wall element, generally in the top or bottom end of the can, which is deformed after filling and seaming to reduce the internal volume of the can and thus to increase the internal pressure. The present invention seeks to provide a manufacturing process for deformable can ends of this type, which is both efficient and reliable.

[0003] Accordingly, there is provided a method of manufacturing a can end comprising the steps of:-

i) forming an end shell comprising a radially outer seaming flange, a chuck wall adjacent the seaming flange, a centre panel and an axially downward countersink joining the centre panel to the chuck wall;

ii) converting the shell to an easy open can end by the steps of:-

a) forming a score on a portion of the centre panel,
b) raising a rivet on the centre panel, and
c) forming a tab and attaching the tab to the rivet,

and subsequently,

iii) reforming the end by moving the centre panel and the seaming flange one with respect to the other to raise the centre panel above the level of the seaming flange.

[0004] Claim 2 concerns a method of manufacturing a package comprising the steps of:

i) forming a can end by the method according to claim 1;

ii) securing the end onto a can body which has been filled with product, and

(iii) performing a second reforming operation on the can end to move the centre panel and the seaming flange one with respect to the other to lower the centre panel to a height below the seaming flange, thereby reducing the headspace within the package.

[0005] The methods described above have the advantage that an end shell of conventional shape is first formed and is then reshaped into a can end having a "high" centre panel, rather than requiring the manufacture of a completely new design of end shell. However, the material from which the can end is manufactured must be softer than that conventionally used, to be able to withstand both the first and second reforming of the centre panel.

[0006] Further embodiments are defined in the dependent claims.

[0007] In this way it is possible that these deformable can ends can be manufactured on equipment similar to that used for the manufacture of conventional beverage can ends, or even by modifying existing equipment.

[0008] Surprisingly, the additional reforming of the centre panel can be carried out directly after the can end leaves the conversion station, rather than requiring the can ends to be transported to a separate reforming machine. Conveniently, the step of reforming the can ends comprises the steps of:

1) clamping the radially outer seaming flange of the end by means of a clamping ring, and

2) moving the clamping ring and a punch one with respect to the other so as to push the centre panel upwardly to a position above the level of the seaming flange.

[0009] The reforming step preferably includes moving the punch upwardly with respect to the clamping ring.

[0010] The invention will now be further described, by way of example only, with reference to the accompanying drawings in which:-

Fig.1 is a schematic process diagram showing the stages in the manufacture of can ends according to the method of the present invention; and
Figs. 2A and 2B are schematic sectional views of tooling for the reshaping of can ends according to the method of Fig.1.

[0011] Referring to Fig.1 a process for the manufacture of can ends is shown in schematic form. A coil 1 of prelacquered and lubricated aluminium alloy is fed to a shell press 2 which stamps out blanks and forms them into a shell shown generally at 3. There are a variety of techniques for forming these end shells, and examples are given in US 4571978, US 4109599 and EP 0398529B to name but three. The end shell 2 is then fed on a carrier belt to a curler 4 which curls over the edges

of the shell to form a seaming flange shown at 5. The curled shells 4 are then fed into a liner 6 where they are inverted, spun and compound is injected onto the underside of the seaming flange as shown at 7. One example of a lining machine is given in GB 2042373.

[0012] The lined end shells are then fed on the carrier belt to a conversion press, shown generally at 8. A rivet 17 is raised on the centre panel 9 of the shell, and a score is applied to the centre panel to define a portion operable to produce an opening therein. More aluminium end stock 10 is used to produce a tab 18 which is staked to the end shell via the rivet on the centre panel. The resulting can end is shown generally at 11.

[0013] The can ends 11 are then fed on the carrier belt to a reshaping station 12 where the centre panel 9 is pushed upwardly to form the completed can end shown at 13.

[0014] Fig.2A shows the can end 11 (shown minus its tab 18 for the sake of clarity) at the reshaping station 12. The centre panel 9 of the can end is pushed upwardly by a punch 14, the seaming flange 5 of the end being supported by a seaming panel support ring 15 and curl support ring 16 respectively. Once the end has been reshaped as shown in Figure 2B, the punch 14 is retracted, and the can end exits the reshaping station 12 on the carrier belt.

Claims

1. A method of manufacturing a can end (11) comprising the steps of:-

- i) forming an end shell (2) comprising a radially outer seaming flange, a chuck wall adjacent the seaming flange, a centre panel and an axially downward countersink joining the centre panel to the chuck wall;
- ii) converting the shell (2) to an easy open can end by the steps of:

- a) forming a score on a portion of the centre panel,
- b) raising a rivet (17) on the centre panel, and
- c) forming a tab (18) and attaching the tab to the rivet (17), and subsequently,

- iii) reforming the end by moving the centre panel and the seaming flange one with respect to the other to raise the centre panel above the level of the seaming flange.

2. A method of manufacturing a package comprising the steps of:

- i) forming a can end (11) by the method accord-

ing to claim 1;

ii) securing the end on to a can body which has been filled with product, and

iii) performing a second reforming operation on the can end (11) to move the centre panel and the seaming flange one with respect to the other to lower the centre panel to a height below the level of the seaming flange, thereby reducing the headspace within the package.

3. A method of manufacturing a can end (11) according to claim 1 further comprising the steps of:

- i) after the step of forming the end shell supporting the formed end shell (2) in a carrier belt;
- ii) moving the carrier belt to transport the end shell (2) to a conversion station (8), where the shell is converted to an easy open end; and
- iii) moving the carrier belt to transport the converted end (11) to the reform station (12), where the end (11) is reformed by moving the centre panel and the seaming flange one with respect to the other to raise the centre panel above the level of the seaming flange.

4. A method according to any preceding claim, wherein the step of reforming the end (11) comprises the steps of:

- i) clamping the radially outer seaming flange of the end (11) by means of a clamping ring, and
- ii) moving the clamping ring and a punch one with respect to the other so as to push the centre panel upwardly to a position above the level of the seaming flange.

5. A method according to claim 4, wherein the reforming step includes moving the punch upwardly with respect to the clamping ring.

Patentansprüche

1. Verfahren zur Herstellung eines Dosendeckels (11) bestehend aus den folgenden Schritten:

i) Herstellung eines Deckelrohlings (2) mit einem radial äußeren Verschleißkopfflansch, einer an den Verschleißkopfflansch anschließenden Deckelkernwand, einem Mittelfeld und einem sich axial nach unten erstreckenden Deckelkern, über welchen das Mittelfeld mit der Deckelkernwand in Verbindung steht;

ii) Umformung des Rohlings (2) zu einem Aufreißdeckel mittels der folgenden Schritte:

a) Herstellung einer Kerbe auf einem Ab-

schnitt des Mittelfeldes,

b) Anbringung eines Nietes (17) auf dem Mittelfeld,

c) Herstellung einer Lasche (18) und Anbringung der Lasche an dem Niet (17) und anschließend

iii) Nachverformung des Rohlings, indem das Mittelfeld und der Verschleißkopfflansch relativ zueinander bewegt werden, und zwar dahingehend, dass das Mittelfeld oberhalb des Niveaus des Verschleißkopfflansches angehoben wird.

2. Verfahren zur Herstellung einer Verpackung bestehend aus den folgenden Schritten:

i) Herstellung eines Dosendeckels (11) gemäß dem Verfahren nach Anspruch 1;

ii) Befestigung des Deckels an einem Dosenkörper, der mit einem Produkt gefüllt worden ist und

iii) Ausführung eines zweiten Nachverformungsschrittes an dem Dosendeckel (11), wobei das Mittelfeld und der Verschleißkopfflansch relativ zueinander bewegt werden, und zwar dahingehend, dass das Mittelfeld bis auf eine Höhe unterhalb des Niveaus des Verschleißkopfflansches abgesenkt wird, um den Kopfabschnitt innerhalb der Verpackung zu vermindern.

3. Verfahren zur Herstellung eines Dosendeckels (11) gemäß Anspruch 1, welches ferner durch die folgenden Schritte gekennzeichnet ist:

i) Aufbringen des geformten Deckelrohlings (2) auf ein Förderband im Anschluss an die Formgebung des Deckelrohlings;

ii) Bewegen des Förderbandes, zwecks Überführung des Deckelrohlings (2) zu einer Umformstation (8), in der der Rohling in einen Aufreißdeckel umgeformt wird und

iii) Bewegen des Förderbandes um den umgeformten Deckel (11) einer Nachformstation (12) zuzuführen, in welcher der Deckel mit der Maßgabe nachverformt wird, dass das Mittelfeld und der Verschleißkopfflansch relativ zueinander bewegt werden, um das Mittelfeld oberhalb des Niveaus des Verschleißkopfflansches anzuheben.

4. Verfahren nach einem der vorangegangenen An-

sprüche, wobei der Schritt des Nachverformens des Deckels (11) die folgenden Schritte umfasst:

- i) Einspannen des radial äußeren Verschleißkopfflansches des Deckels (11) mittels eines Klemmrings und
- ii) Bewegen des Klemmrings und eines Stempels relativ zueinander mit der Maßgabe, dass das Mittelfeld aufwärts bis in eine Position oberhalb des Niveaus des Verschleißkopfflansches bewegt wird.

5. Verfahren nach Anspruch 4, wobei der Nachverformschritt ein Bewegen des Stempels in Aufwärtsrichtung relativ zu dem Klemmring umfasst.

Revendications

1. Procédé de fabrication d'une extrémité de boîte de conserve (11) comprenant les étapes de :

- i) mise en forme d'une virole d'extrémité (2), comprenant un rebord de sertissage radialement extérieur, une paroi d'appui adjacente au rebord de sertissage, un panneau central et un rentrant, dirigé axialement vers le bas et joignant le panneau central à la paroi d'appui ;
- ii) transformation de la virole (2) en une extrémité de boîte à ouverture facile, au moyen des étapes de :

- a) formation d'un marquage par rainure sur une partie du panneau central,
- b) mise en place d'un rivet (17) en saillie sur le panneau central, et
- c) mise en forme d'une languette (18) et fixation de la languette sur le rivet (17), et ensuite,

iii) refaçonnage de l'extrémité par un déplacement du panneau central et du rebord de sertissage l'un par rapport à l'autre, afin de relever le panneau central au-dessus du niveau du rebord de sertissage.

2. Procédé de fabrication d'un emballage, comprenant les étapes de :

- i) mise en forme d'une extrémité de boîte (11) par le procédé selon la revendication 1 ;
- ii) fixation de l'extrémité sur un corps de boîte, qui a été rempli d'un produit ; et
- iii) exécution d'une seconde opération de refaçonnage sur l'extrémité de boîte (11), afin de déplacer le panneau central et le rebord de sertissage l'un par rapport à l'autre, pour ainsi abaisser le panneau central jusqu'à une hau-

teur située audessous du niveau du rebord de sertissage, de manière à réduire l'espace libre à l'intérieur de l'emballage.

3. Procédé de fabrication d'une extrémité de boîte de conserve (11) selon la revendication 1, comprenant en outre les étapes de :
 - i) après l'étape de mise en forme de la virole d'extrémité, soutien de la virole d'extrémité (2) ainsi formée, par une courroie transporteuse ; 10
 - ii) déplacement de la courroie transporteuse afin d'acheminer la virole d'extrémité (2) jusqu'à un poste de transformation (8), où la virole est transformée en une extrémité à ouverture facile ; et 15
 - iii) déplacement de la courroie transporteuse afin d'acheminer l'extrémité transformée (11) jusqu'au poste de refaçonage (12), où l'extrémité (11) est refaçonée en déplaçant le panneau central et le rebord de sertissage l'un par rapport à l'autre afin de relever le panneau central au-dessus du niveau du rebord de sertissage. 20
4. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'étape de refaçonage de l'extrémité (11) comprend les étapes de :
 - i) bridage du rebord de sertissage radialement extérieur de l'extrémité (11), au moyen d'un anneau de serrage, et 25
 - ii) déplacement de l'anneau de serrage et d'un poinçon l'un par rapport à l'autre, de manière à pousser vers le haut le panneau central jusqu'à une position située au-dessus du niveau du rebord de sertissage. 30
5. Procédé selon la revendication 4, dans lequel l'étape de refaçonage comprend le déplacement du poinçon vers le haut par rapport à l'anneau de serrage. 35

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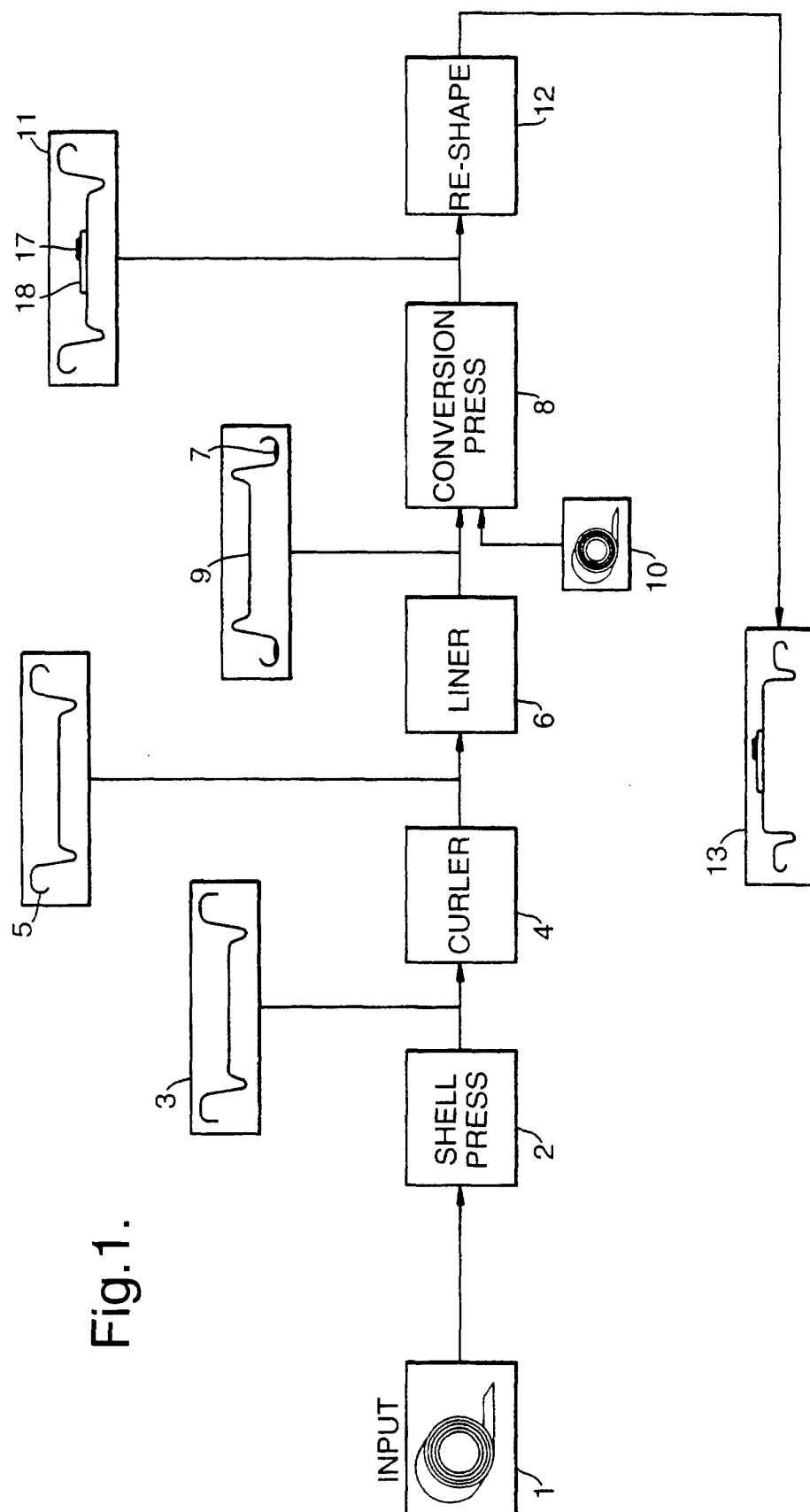


Fig.1.

Fig.2A.

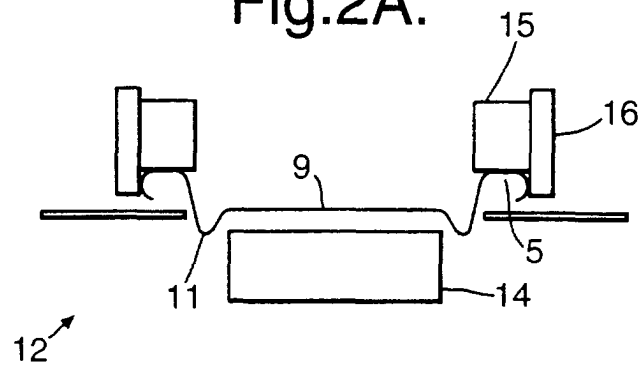


Fig.2B.

