

CONTAINER CLOSURE

TECHNICAL FIELD

This invention relates to container closure.

BACKGROUND ART

- 5 For simplicity, the present invention shall be referred to throughout this specification in the context of improvements in the sealing of containers such as cans. However, it is also envisaged that the present invention may be used in other applications.

- Reference throughout this specification shall also be restricted, for clarity, to cans used for storing foodstuffs and other perishable items. Again however, the present invention
10 can apply to analogous situations outside of this area, and to containers used for storing other substances.

- A conventional can that is designed to be reusable once opened is the ring-lid-foil (RLF) type can. One such can is disclosed in New Zealand Patent No. 218651 which utilises a thin opaque sheet of aluminium foil to seal the aperture of the can. Typically these cans
15 have a replaceable lid which can be used to seal the container once the foil has been removed.

- A typical method of making sealed RLF cans is to have a continuous sheet of aluminium passed over a ring/lid assembly. A former pushes the aluminium foil into the various channels of the ring lid assembly. The nature of the aluminium foil is such that once
20 bent into these channels it holds its shape and hence position relative to the ring.

The assembly process then involves the addition of sealing compound into one of the channels of the ring.

- The manufacture of a ring lid and foil assembly as described above is one of the slowest steps in the packaging of material into a sealed can. Therefore, it is usual to manufacture
25 large quantities of these assemblies in advance, which are then stored until they are introduced as part of a subsequent packaging process.

Next the rim of a can body is placed onto the sealing compound. Next the outer flange of the ring is folded and crimped around the rim of the can to provide an airtight seal.

- After this, the material is placed into the can body. If the material is milk powder then
30 this is often packed in a modified atmosphere.

As a final step the base of the can is placed onto the body of the can, the contents of the can vacuumed and the can sealed.

Unfortunately, there are a number of problems associated with conventional cans such as those described above.

- 5 One problem is that in order to initially gain access to the products stored within the can, it is necessary to cut or rip through the foil which seals the can. This action can often result in small fragments of foil contaminating the foodstuffs in the can.

Coupled with this problem are the sharp edges of the foil (created by the cutting action) which can injure the consumer reaching into the can to scoop out its contents.

- 10 Another problem with conventional cans is that the contents of the can cannot be viewed until after the foil has been removed.

This is a concern as it may be impossible to detect whether the can has been tampered with, or is in sufficiently fresh condition to be consumed.

- 15 An attempt to overcome some of these disadvantages has been made with the introduction of cans having a thick clear layer of plastics material sealing the can below the lid. Typically these layers are made from polyvinyl chloride (PVC) and in the form of rigid disks being approximately 340 microns thick.

Unfortunately, while this development overcomes a number of problems associated from having an opaque aluminium foil as a seal, additional problems are introduced.

- 20 The method by which the disks are made (injection moulding) is expensive compared to the process by which a continuous film of aluminium foil is produced.

Further a major problem associated with the use of the clear disks is in the actual process of using the disks in the assembly of the ring and lid.

- 25 Firstly the plastics materials has to be cut to shape if not already injection moulded. Because of the rigid nature of the disk it has to be thermoformed to the contours of the ring. Finally, the disk has to be placed on top of the ring/lid assembly.

This multistep practice is in stark contrast to that used for aluminium foil and consequently is a slower and more expensive practice.

- 30 Another problem with the thick clear film is the difficulty in accessing the contents within the can as a thick film can be difficult for a consumer to break.

Yet another disadvantage of using the thick film is that the film only stays in position through the mechanical process of crimping. This does not allow the ring lid assemblies to be stored in the same manner as RLF assemblies with aluminium foil. Therefore, the assembly of the ring lid disk can only occur as part of the can making process which slows the process down considerably. It is believed that, in a number of can making establishments, this process is manually performed - which is highly inefficient and costly.

It would be desirable if there could be provided a method of sealing cans that combines the visual and chemical advantages of a clear film with the manufacturing advantages of aluminium foil.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

15 DISCLOSURE OF INVENTION

According to one aspect of the present invention there is provided a method of providing a seal for a container, the seal including a flexible film having a degree of visual transparency, the method characterised by the steps of

- a) presenting a ring to a flexible film, and
- 20 b) causing the film to contour to at least some of the surfaces of the ring

wherein the film is secured with respect to the ring by the provision of adhesive between the ring and the film.

According to a related aspect of the present invention there is provided a seal for a container, said seal including a ring and a flexible film adhered to the ring by the provision of adhesive between the ring and the film.

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According to a further aspect of the present invention there is provided a can including a seal substantially as described above.

The container will now be referred to throughout this specification as being a can. However, it should be appreciated that the principles of the present invention can apply to containers having a different construction from conventional cans. For example, the

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container may be a box-like structure, or may be made from materials other than conventional steel.

It is envisaged that the ring will be, in preferred embodiments, of a similar construction to that used in conventional can assemblies. However, it should be appreciated that the
5 ring may be any device that provides an attachment mechanism to the can body and an aperture for access to the contents of the can.

In preferred embodiments of the present invention the ring is presented to the film with the lid in place as in the conventional RLF assemblies. It should be appreciated however that in some embodiments of the present invention the lid need not be provided at this
10 stage, or at any other stage. For example, it may be desired only to have a seal in the form of a film rather than an additional reusable lid.

The film may be any film which has the aforementioned properties. Preferably the film has sufficient flexibility that it can be readily rolled and thus be used in a similar manner to which aluminium foil is used. Usually this will be a film that is thinner than the thick
15 clear film previously used.

While the film in preferred embodiments is made of plastics material, this is not necessarily the case and it should be appreciated that principles of the present invention could apply to film made of other materials having the required properties.

If the film is of a plastics material, then it is envisaged that for the film to have the
20 desired flexibility and durability required of a seal, the thickness of the film will be in the order of approximately 100 microns. Other thicknesses of film are of course envisaged. A typical range is 20-200 microns.

The degree of visual transparency of the film can vary according to various requirements of the manufacturer. Although in preferred embodiments the film is fully transparent,
25 this need not be necessarily so. For example, the film could have "windows" with opaque areas and transparent areas. This may be the result of areas of different materials, and/or as a result of a pigmenting or printing process.

In other embodiments the film may be translucent, having a degree of opacity.

The important feature is that the film provides the means by which the contents of the
30 can can be seen through the film.

The film may be caused to contour to some of the surfaces of the ring by a variety of means.

In one embodiment, the film may be contoured to the ring by the use of a former which is contoured in such a manner that it can press the appropriate portions of the film into the contours of the ring.

5 In other embodiments of the present invention this may be achieved by pressure forming, for example, the application of directed jets or general air pressure.

In yet another embodiment of the present invention the contouring of the film to the lid may be achieved by vacuum forming, for example by the application of a vacuum from beneath the RLF assembly.

10 Vacuum forming or pressure forming can offer the advantage that the film may adhere to some degree to the lid.

If a can is being exported from a low altitude to a high altitude, the gases within the can may expand. This can cause the film sealing the can to push upwards and in some cases pop the lid or rupture the film. Obviously, this can cause considerable problems.

15 However, if the film adheres to the lid in some degree it also sticks the lid to the ring and thus it cannot push the lid off the can.

20 Another advantage of having some adhesion of the film to the lid is that less surface area of the film is available for oxygen to permeate through. The resultant minimal permeation means that a less expensive barrier material could be used. This can be significant if the present invention is used in packaging cheaper items than milk powder and coffee - for example nuts.

25 As can be appreciated the physical features of thin film is such that it has insufficient rigidity to hold itself into position in the contours, unlike aluminium foil. Thus, the present invention requires the provision of an adhesive between the ring and the film. Unless the film is held onto the ring assembly by some means, stacking of the ring RLF assembly cannot be achieved meaning some of the advantages of the present invention would be lost.

Unfortunately, a plastics material to metal bond is difficult to achieve unlike plastics to plastics or foil to plastics.

30 Another reason that it is important to have the film secured with respect to the ring is to give a good surface for the sealing compound to be applied later to the RLF assembly.

The former itself may have a variety of configurations or different features to assist in the assembly process.

For example, the former may have a heated surface which can assist the film to contour (generally with less wrinkles) or adhere to the ring.

- 5 Thermoforming the film to the ring by the former may cause an interference fit which can assist the adhesive in holding the film to the ring.

Depending on the material from which the film is made, there may be provided release surfaces to ensure that the film does not stick to the former. Again, these release surfaces may be of any suitable material or configuration. In some applications of the
10 present invention the release surfaces may either be Teflon™ material or perhaps a silicone rubber which has good heat transfer properties.

The former may also provide a means by which the film can be cut to shape. Again, this may be achieved by a variety of ways.

- 15 For example there may be a cutting edge surrounding the ring that the film can be stretched over. Subsequent contraction of the cut film whether mechanical or through heating may fit the film to the ring.

In one embodiment the former may be in the form of a heated punch and have a sharp outer edge. The edge may cut the film and the heated surface may assist in the contouring of the cut film to the ring. If the motion of the former onto the RLF
20 assembly is sufficiently fast then it is possible that one quick action can perform the cutting and contouring of the film required.

In another embodiment there may be provided an outer sleeve to the former which has a cutting edge. This outer sleeve may be spring loaded in such a manner that the film may be cut before or after the film has been contoured, depending on what is desired.

- 25 In some embodiments of the present invention the film may be contoured to the ring through a variation of the traditional vacuum skinning process where the assembly is passed through a vacuum chamber.

The adhesive may be any substance capable of ensuring that the film can be held with respect to the ring.

In one embodiment of the present invention the adhesive may be applied to the ring before the film is placed onto the lid ring. While this is an embodiment of the present invention which could work, this does add a step to the assembly process. As can be seen by the present invention it is successful in eliminating a number of the extra steps imposed by the thick film sealing method. Therefore, in preferred embodiments care has been taken to avoid as many additional steps as possible to ensure the efficiency of the process.

Thus, in a preferred embodiment of the present invention the film used incorporates an adhesive layer in its structure capable of adhering the film to the ring.

10 It should be appreciated that the film can come in any form which can provide the desired effect. In one embodiment, the film has at least a gas barrier layer (to ensure viability of the can contents) and an adhesive layer.

In preferred embodiments of the present invention the film is a five layer structure which includes a gas barrier layer, a structural strength layer and an adhesive layer, these three layers being bonded together by two bond layers.

The addition of a structural layer ensures that the film maintains its integrity during the sealing process and subsequent handling until the film is ready to be broken by the consumer wanting to access the contents of the can.

A variety of materials can make up each of the layers.

20 The applicant has found that a film of the structure given below works particularly well with the present invention.

LAYER	MATERIAL	THICKNESS
Structural	Ionomer	65 microns
Bond	LLDPE Based Copolymer	5 microns
Gas Barrier	EVOH 32-44% Ethylene	10 microns
Bond	LLDPE Based Copolymer	5 microns
Adhesive	EVA 28% VA	15 microns

The above is given as an example of a preferred film. It should be appreciated that other thicknesses and compositions may be used. Further, there is not necessarily a requirement to have five layers and other numbers of layers can be used depending upon the use of the present invention.

- 5 Some alternate materials for the layers are given below.

LAYER	MATERIAL
Structural	Polyethylene, nylon, EVOH
Bond	Any standard bonding material
Gas Barrier	EVOH of alternate ethylene content, nylon, HDPE, PVDC

EVA adhesive can adhere film readily to metal upon the application of heat and/or pressure. This can be applied by a former as described earlier in this specification.

- 10 Sealing compound may be added to the RLF assembly immediately after it is formed or during the can assembly process. The sealing compound may be any suitable compound and in one embodiment may be rubber.

It is believed that with the present invention less sealing compound can be used. This is possibly because of the pliability of having a thin film compared to aluminium or a thick film.

- 15 One advantage of less sealing compound is that the RLF assembly is cheaper to produce.

Another advantage of less sealing compound is that there is a reduced buildup of compounds occurring in front of the seaming rollers when the ring is being attached to the can body.

- 20 It has been found with the present invention the amount of plastics film used in the outside of the ring is more critical than in the aluminium foil process. The "amount of film" shall be interpreted as volume - that is, surface area times thickness.

Particularly, the applicants have found that less plastics material is required than aluminium foil. If too much plastics material is used, the film may shear off at the

outside of the ring when the can is applied. This can lead to bundling of the film on the outer seal and a "fat seam". Such a seam may not provide a perfect seal as well as providing a seam that does not look acceptable to the consumer.

5 Sometimes, the ability to just visually inspect the contents of a can through a clear film is not sufficient to determine whether the can has been contaminated or tampered with. For example, there may be a micro leakage that have allowed atmospheric gases into the can. The oxygen in the atmospheric gases can cause degradation of the contents in a can making them unfit to consume. However, it is possible that this degradation may not cause a physical change to the can contents or a change that is not readily recognised by
10 a consumer. Further, chemical substances may be injected into the can via hypodermic syringe through an act of sabotage.

Further, it is possible for someone to tamper with the contents of the can and not provide an immediate visual indication of same. For example, foreign material may be below the top surface of the powder.

15 According to a further aspect of the present invention there is provided a container capable of being sealed, the container including a visual indicator of at least one parameter within the container.

Reference throughout this specification shall be made to the container as being the similar type as previously described.

20 The visual indicator shall be taken to mean any indicator capable of converting a non-visual parameter into visual form.

These parameters may include but should not be limited to the following:

- Alkalinity/acidity.
- Various gases.
- 25 • Chemical compounds.
- Toxins.
- Pressure.
- Electromagnetic radiation.
- Humidity and moisture.

Reference throughout this specification shall now be made to the parameter as being a gas.

5 In one embodiment of the present invention the indicator may indicate increased levels of oxygen. This will generally occur if the contents of the can have been packed under modified atmosphere which has a low oxygen component. If the integrity of the seal in the can is breached then the oxygen and the atmospheric gases which enter the can is detected by the indicator.

10 In other embodiments the indicator may detect the reduction of carbon dioxide. Generally a modified atmosphere has a high carbon dioxide content whereas the carbon dioxide content of air is in the order of 0.03%. Thus, atmospheric gas entering a breach in the sealed can (which is usually packed under vacuum) will dilute the concentration of carbon dioxide in the can. Alternately the carbon dioxide within the can may just escape through the breached seal.

15 Sometimes the degradation of a product itself may result in the production of various gases which can be detected by the indicator.

In some embodiments the visual indicator may just be a loose object lying on the top surface of the can contents which is visible through a clear seal.

In other embodiments the visual indicator may be attached to the inside wall of the can and be visible through a clear seal.

20 In preferred embodiments of the present invention the indicator is actually incorporated into the film that seals the can.

This is the preferred embodiment as the inclusion of the indicator can be part of an existing packaging step rather than an additional step which can impair the efficiency of the process.

25 The nature of the visual indication can be of any suitable form. For example, the visual indicator may merely change colour. In other embodiments the indicator may either become opaque or transparent. In yet other applications the intensity of the indicator colour may change.

30 Suitable indicators which can be used with the present invention for the detection of carbon dioxide may be a salt of an indicator anion and a lipophilic organic quaternary cation.

- Suitable indicator anions may be azo dyes (including alpha-naphthol orange), nitrophenol dyes (including m-nitrophenol and p-nitrophenol), phthalein dyes (including alpha-naphtholphthalein and o-cresol phthalein), sulphonephthalein dyes (including m-cresol purple, cresol red, thymol blue and alpha-naphtholsulphonephthalein),
- 5 triphenylmethane dyes (including rosolic acid) and indophenol dyes (including indophenol and 1-naphthol-2-sulphonic acid indophenol).

Examples of suitable quaternary cations are:

- ammonium cations (including benzyltrimethyl ammonium, trioctylmethyl ammonium, tripropylmethyl ammonium, tetrabutyl ammonium, tetrapexyl ammonium and tetraoctyl
- 10 ammonium) and phosphonium cation (including tetraphenyl phosphonium, trioctyl phosphonium and hexadecyl tributyl phosphonium). A preferred quaternary cation is tetrabutyl ammonium.

These indicators are discussed in greater detail in international Patent Application No. PCT/GB90/01501.

- 15 A suitable oxygen indicator may be an indophenol type dye such as 2,6-dichloroindophenol. This dye may be used as ink by mixing it with a reducing agent, alcholye agent, moisture retaining agent, binder, solvent and water. The use of this dye is discussed in greater detail in Japanese Patent Application No. JP06034619-A.

- In some embodiments of the present invention there may be provided a key against
- 20 which the indicator may be compared to provide the consumer with information as to the meaning of the indicator.

If the indicator forms part of the film, it may come in a number of different shapes, for example, the indicator may be a strip which is co-extruded with the film.

In other embodiments the indicator may be a whole of the film sealing the can.

- 25 In yet other embodiments the indicator may be a discrete pattern on the film.

- The indicator may form a part of a multi-layer film. The layers of the film should preferably be such that the gas present within the container can readily permeate to the indicator to effect the visual change. Preferably also the film is configured so that external layers of the film cannot allow atmospheric gas to permeate through to the
- 30 indicator.

It may be possible that the indicator adds an additional thickness to the film which could interfere with the sealing process.

5 While modifications may be made to the sealing process to accommodate this (such as changing the tension in the seaming rollers), it is envisaged that this probably could be addressed by having the indicator present in the film in discrete indicia. These indicia on the film may be indexed with the RLF assembly so that pure film (and no indicator) is situated where the film is sealed to the ring.

It can be seen that the present invention has a number of advantages over the prior art.

10 There is provided an efficient method to seal a can with transparent film. This allows a consumer to tell at a glance if the contents of the can are fresh and/or have been tampered with.

A thin film may be used which can be easily cut to access the can without creating sharp edges.

15 Any fragments of the film that may stray into the contents of the can may be inert and as a result may pass through a person's body without a harmful effect, unlike the foil fragments used in conventional cans.

The ability to provide an indicator which can advise the consumer of the freshness of the contents of the can is a significant advantage.

Finally, the present invention can be utilised in an efficient manufacturing process.

20 BRIEF DESCRIPTION OF DRAWINGS

Further aspects of the present invention will become apparent from the ensuing description which is given by way of example only and with reference to the accompanying drawings in which:

- Figure 1 illustrates a typical prior art RLF assembly before attachment to a can, and
- 25 Figure 2 illustrates an RLF assembly in accordance with one embodiment of the present invention, and
- Figure 3 is a cut-away view of equipment used in one manufacturing process in accordance with the present invention, and

Figure 4 is a cross-sectional view of an RLF assembly in accordance with the present invention which has been attached to a can, and

Figure 5 is a plan view showing the use of indicators with the present invention.

BEST MODES FOR CARRYING OUT THE INVENTION

- 5 **Figure 1** is an illustration of a conventional RLF assembly generally indicated by arrow 1.

The assembly 1 includes a ring generally indicated by arrow 2, a lid 3 and a film 4 in the form of aluminium foil.

- 10 The ring 2 has three main sections. The first section 5 is a flange or channel into which the aluminium foil has been pressed. The flange 5 is folded over and crimped to the can wall to seal the RLF assembly 1 to a can 31. This is more clearly shown in Figure 4.

The mid-section 6 of the ring 2 provides a space between the ring 2 and lid 3 which enables a person to readily lever off the lid 3 from the can.

The third section 7 of the ring 2 acts as a support for the lid 3.

- 15 The lid 3 includes a substantially flat central portion 8 and a flange 9 that overhangs section 7 of the ring 2.

The nature of the aluminium foil 4 is that it can be pressed into shape into the ring 2. This can be seen by the flat portion of the foil 4 that is pressed against the mid-section 6. It should also be noted that the foil 4 extends almost to the periphery of the flange 5.

- 20 **Figure 2** illustrates an RLF assembly generally indicated by arrow 11 which is in accordance with one embodiment of the present invention.

The ring 12 and lid 13 in this embodiment have the same configuration as the prior art ring 2 and lid 3.

- 25 The film 14 attached to the ring 12 is a multilayered plastics film of a type described previously in the patent specification.

In contrast to the prior art RLF assembly, the inventors have found that the amount of plastics material in the flange 15 of the ring 12 can be critical. Too much plastics material 14 can cause bundling of the film in the outer seal 30 (which is shown more

clearly in Figure 4). This bundling of film can lead to a fat seam and subsequent poor sealing properties.

If too little film is used, then it is possible that the film does not provide the required seal.

5 In one embodiment of the present invention the flat surface of the flange 15 is in the order of 3.32 millimetres. It has been found that the tolerances of where the edge of plastics material 14 can fit into the flange 15 is from the edge of the flat portion to approximately the middle of the flat portion. This is illustrated in Figure 2 and avoids the problems discussed above.

10 The prior art assembly illustrated in Figure 1 shows a portion of the aluminium foil 4 formed parallel to the ring flat section 6. Generally this feature is required where the can contents are to be subjected to a vacuuming process.

The amount of the parallel forming is at the discretion of the can-maker and is adjusted to minimise the void created between the ring, lid, and foil. Failure to minimise this void
15 may result in difficulties during the vacuuming process as the air contained in the void may be of sufficient volume and pressure to cause the lid 8 to be partially or totally dislodged from its engagement with the ring 2.

The application of the plastic film may be similarly adjusted by the can-maker depending upon the intended can contents and the type of filling process used. The film would be
20 attached over this area in the same manner as the area 16 in Figure 2.

Figure 2 does not show a parallel area between 16 and 14 as described above and in this form the ring, lid, and foil assembly would probably be used on non-gassed products.

Figure 3 illustrates one way by which the film 14 can be attached to a ring lid assembly generally indicated by arrow 11.

25 A length of film 14 passes over a ring 12 and lid 13. A heated former 20 with an outer cutting sheath 21 descends onto the film 14. The positioning of the sheath 21 and former 20 is such that the film 14 is cut fractionally before the heated former 20 pushes the film 14 into the channel 15.

The action of the heated former 15 causes the adhesive layer of the film 14 to adhere the
30 film 14 to the ring 12.

Although the film 14 is cut outside of the ring 12, the action of the former to contour the film to the ring/lid assembly 11 means that the cut outer edge of the film 14 is positioned within the channel 15 in accordance with the tolerances discussed earlier.

5 After the RLF assembly has been formed, a sealing compound (not shown) is then placed on top of the film 14 within the channel 15.

The final RLF assemblies are then stored until used in the final can assembly process.

Figure 4 illustrates how a typical RLF assembly generally indicated by arrow 11 is affixed to a can 31. It can be seen that the foil 14 has been folded over with the flange 15 and the wall of the can 31 to form a seam generally indicated by arrow 30.

10 Figure 5 is a top view of a can 31 with a lid off showing a film 14 and a possible arrangement of indicators 32, 33 and 34.

In this embodiment the indicators 32, 33 and 34 are extruded with the film 14. Each of the indicators change colour according to different parameters they sense within the can 31. For example, indicator 32 may detect moisture, indicator 33 may detect CO₂ and
15 indicator 34 may detect O₂.

Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof as defined in the appended claims.

**CLAIMS:**

1. A method for providing a seal for a container, the seal including a flexible film having a degree of visual transparency and a ring, the method characterised by the steps of
 - a) presenting the ring to a flexible film, and
 - b) causing the film to contour at least some of the surfaces of the ring, and
 - c) securing the film to the ring by the provision of adhesive between the ring and the film.
2. A method as claimed in claim 1 characterised by the further step of contouring the film to the ring by using a former to press the film into the ring.
3. A method as claimed in claim 2 wherein the former has a heated surface that presses against the film.
4. A method as claimed in either claim 2 or claim 3 wherein the former includes a cutting edge for cutting the film.
5. A method as claimed in claim 1 wherein the film is contoured to the ring by a process of vacuum forming or pressure forming.
6. A method as claimed in any one of claims 1 to 5 wherein the film incorporates an adhesive in its structure capable of adhering the film to the ring.
7. A method as claimed in any one of claims 1 to 6 wherein the film is a five layer structure including a gas barrier layer, a structural layer, an adhesive layer and two bond layers.
8. A method as claimed in any one of claims 1 to 7 wherein the film includes a visual indicator capable of indicating at least one parameter within the container.
9. A method as claimed in claim 7 characterised in that the parameter detected by the indicator is gas.
10. A method as claimed in any one of claims 1 to 9 characterised by the further step of attaching the seal to the container by crimping the external edges of the seal to the walls of the container.
11. A seal for container including a ring and a flexible film adhered to the ring by the provision of an adhesive between the ring and film.



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12. A seal as claimed in claim 11 wherein the film includes an adhesive layer.
13. A seal as claimed in claim 12 wherein the film is a five layer structure including a gas barrier layer, a structural layer, an adhesive layer and two bond layers.
14. A seal as claimed in any one of claims 11 to 13 wherein the film includes a gas indicator.
15. A container including a seal as claimed in any one of claims 11 to 14.
16. A container as claimed in claim 15 wherein the seal is attached to the container by crimping the external edges of the seal to the walls of the container.
17. A sealed can including a visual indicator of at least one parameter within the can.
18. A method substantially as herein described with reference to and as illustrated by the accompanying drawings except Figure 1.
19. A seal substantially as herein described with reference to and as illustrated by the accompanying drawings except Figure 1.
20. A container substantially as herein described with reference to and as illustrated by the accompanying drawings except Figure 1.
21. A can substantially as herein described with reference to and as illustrated by the accompanying drawings except Figure 1.

This Sheet Has Been Replaced



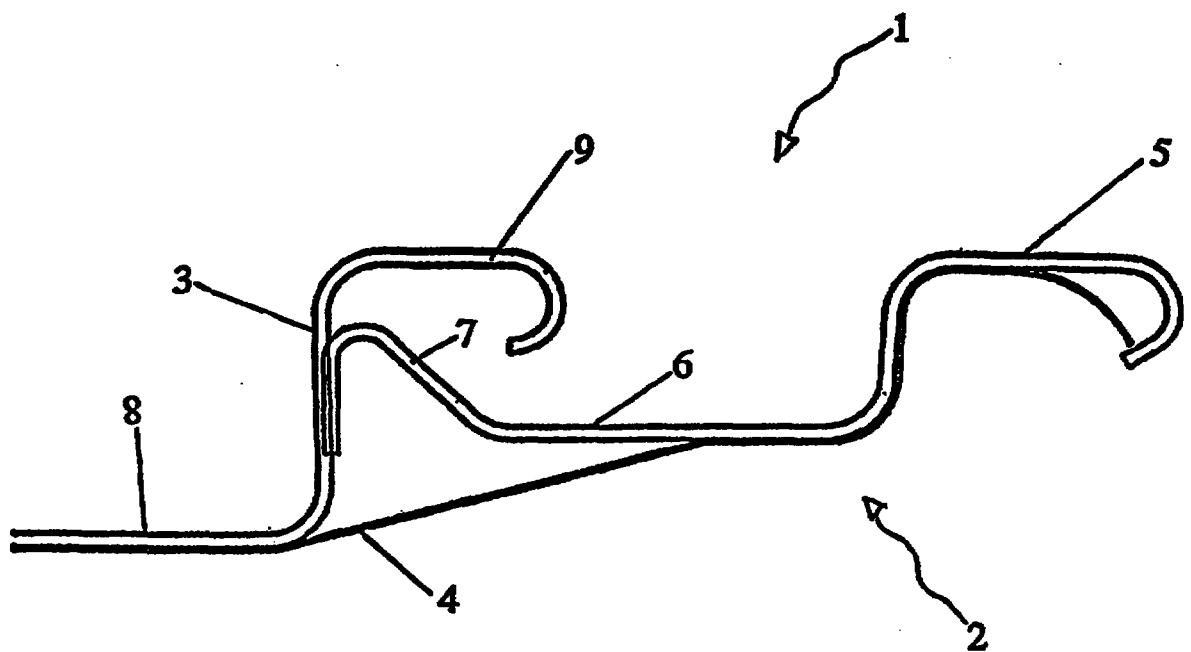


FIGURE 1

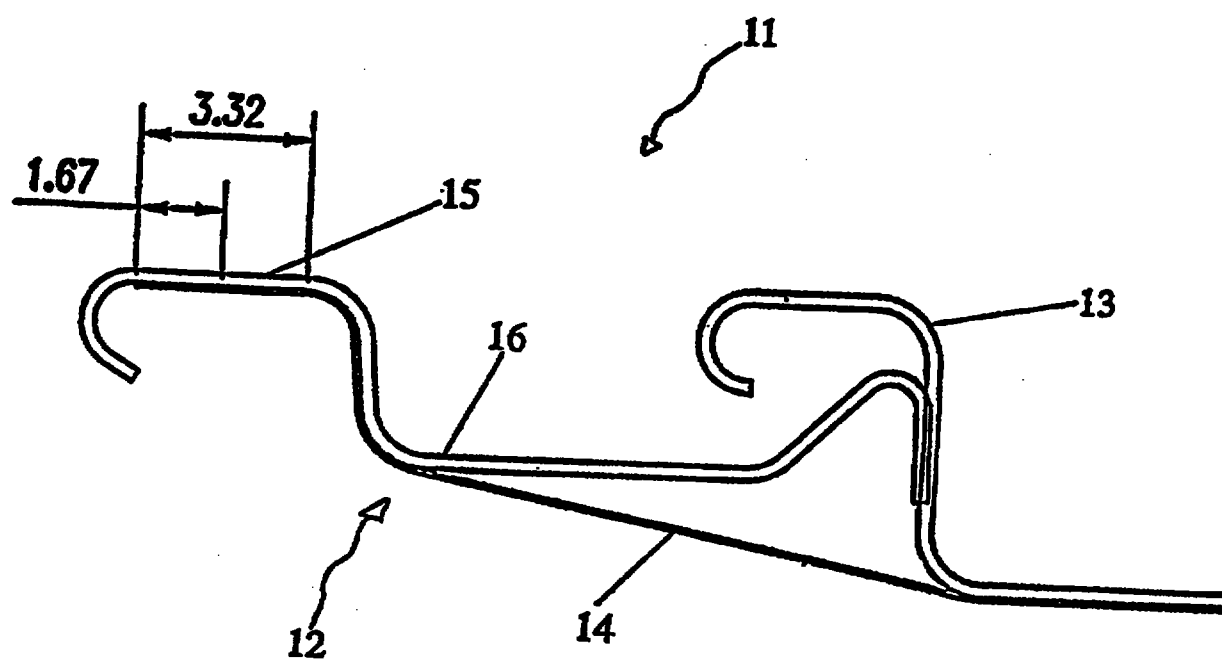


FIGURE 2

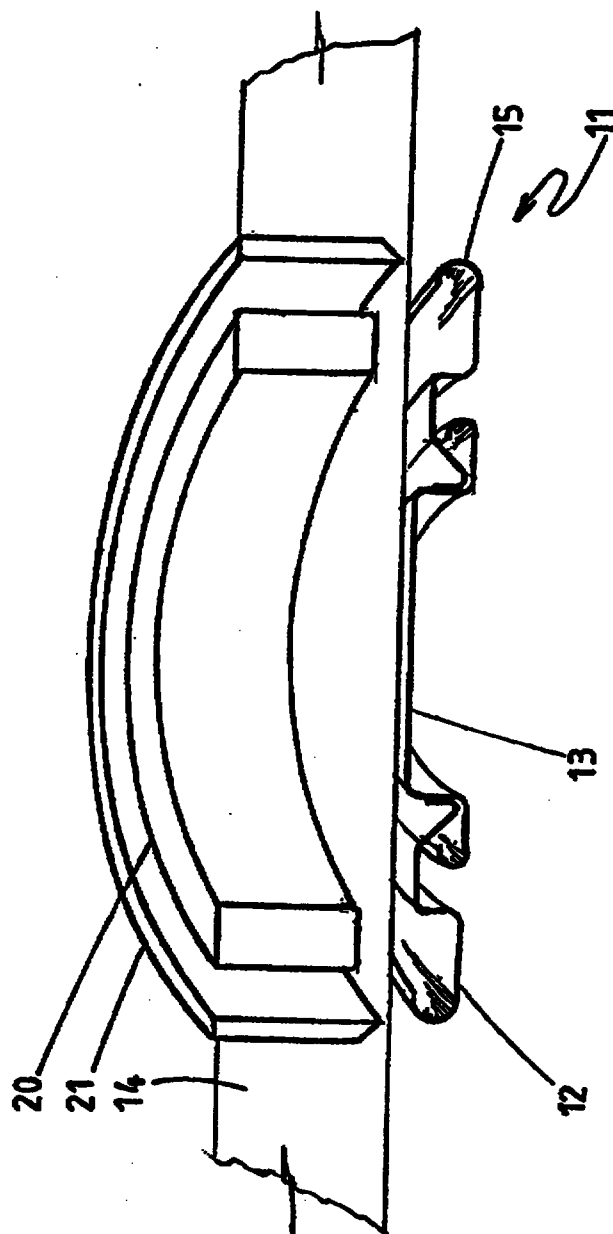
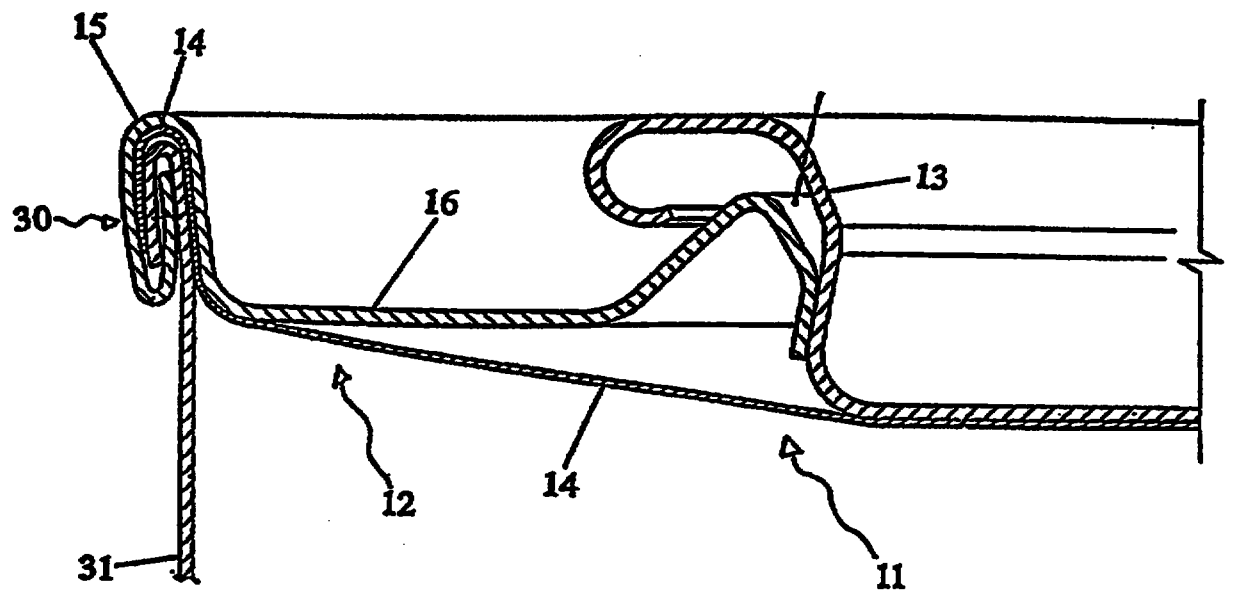


FIGURE 3

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**FIGURE 4**

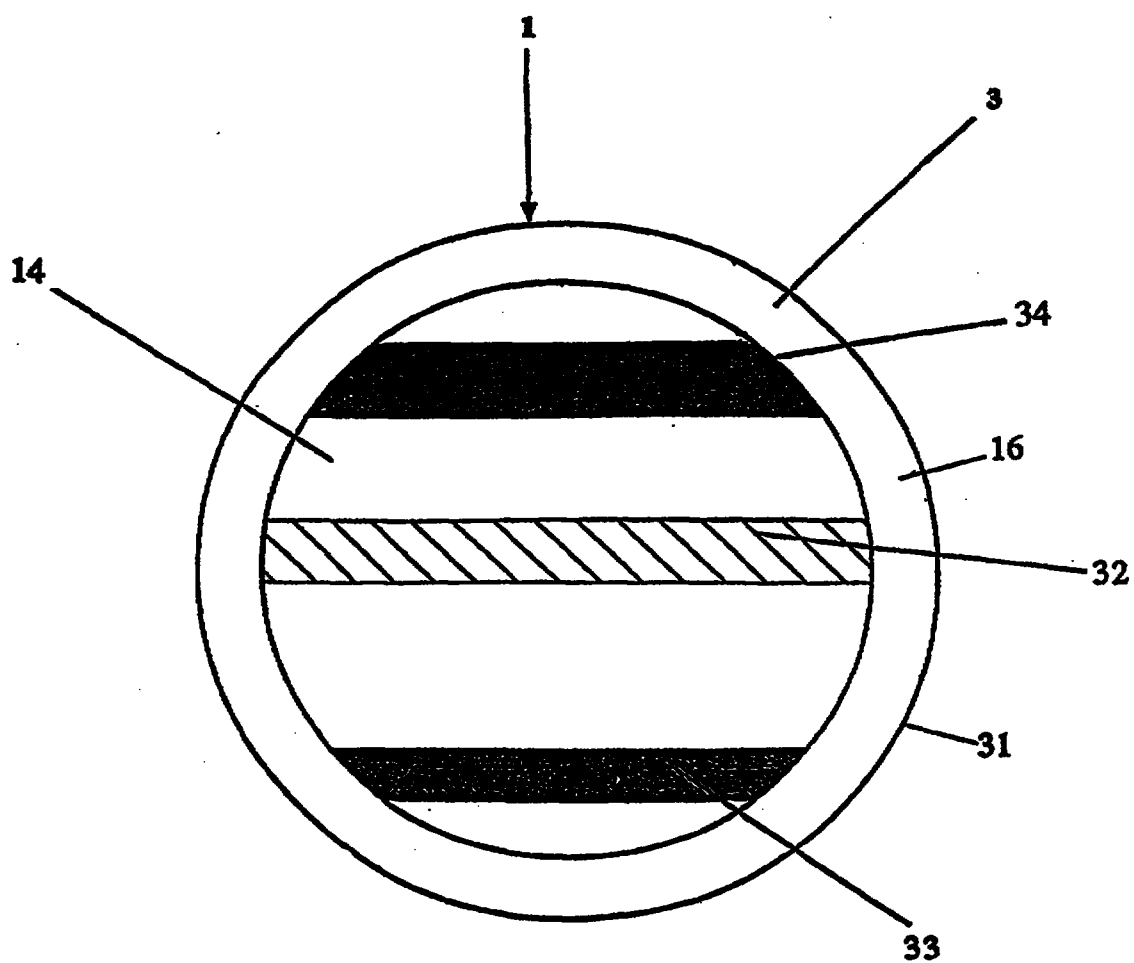


FIGURE 5

CLAIMS:

1. A method for providing a seal for a container, the seal including a flexible film having a degree of visual transparency, and a ring

the method characterised by the steps of
 - a) presenting the ring to a flexible film, and
 - b) causing the film to contour at least some of the surfaces of the ring, and
 - c) securing the film to the ring by the provision of adhesive between the ring and the film.
wherein the thin flexible film has a thickness of less than 200 microns.
2. A method as claimed in claim 1 characterised by the further step of contouring the film to the ring by using a former to press the film into the ring.
3. A method as claimed in claim 2 wherein the former has a heated surface that presses against the film.
4. A method as claimed in either claim 2 or claim 3 wherein the former includes a cutting edge for cutting the film.
5. A method as claimed in claim 1 wherein the film is contoured to the ring by a process of vacuum forming or pressure forming.
6. A method as claimed in any one of claims 1 to 5 wherein the film incorporates an adhesive in its structure capable of adhering the film to the ring.
7. A method as claimed in any one of claims 1 to 6 wherein the film is a five layer structure including a gas barrier layer, a structural layer, an adhesive layer and two bond layers.
8. A method as claimed in any one of claims 1 to 7 wherein the film includes a visual indicator capable of indicating at least one parameter within the container.
9. A method as claimed in claim 7 characterised in that the parameter detected by the indicator is gas.

AMENDED SHEET



10. A method as claimed in any one of claims 1 to 9 characterised by the further step of attaching the seal to the container by crimping the external edges of the seal to the walls of the container.
11. A seal for container including a ring and a flexible film adhered to the ring by the provision of an adhesive between the ring and film, wherein the thin flexible film has a thickness of less than 200 microns.
12. A seal as claimed in claim 11 wherein the film includes an adhesive layer.
13. A seal as claimed in claim 12 wherein the film is a five layer structure including a gas barrier layer, a structural layer, an adhesive layer and two bond layers.
14. A seal as claimed in any one of claims 11 to 13 wherein the film includes a gas indicator.
15. A container including a seal as claimed in any one of claims 11 to 14.
16. A container as claimed in claim 15 wherein the seal is attached to the container by crimping the external edges of the seal to the walls of the container.
17. A container as claimed in anyone of claims 15 to 16 which including a visual indicator of at least one parameter associated with the contents of the container.



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(57) Abstract This invention relates to a method of creating a seal for a container with a transparent film. This method has particular application to the use of thin films with rings that form the top of a can. Embodiments of the invention that incorporate a gas indicator into the seal are also discussed.		