United States Patent [19]

Fuhrmann

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[54] **CONTAINER**

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[51] **Int. Cl.**.....**B65d 7/42**

[58] **Field of Search**.....220/67, 64, 81; 113/120 A, 113/120 Y; 260/93.7; 117/132 C, 161 UF

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[57] **ABSTRACT**

A can which is of lightweight construction and suitable for heat sterilization, the can being formed from plastics coated aluminum and all seams sealed by heat sealing.

4 Claims, 6 Drawing Figures

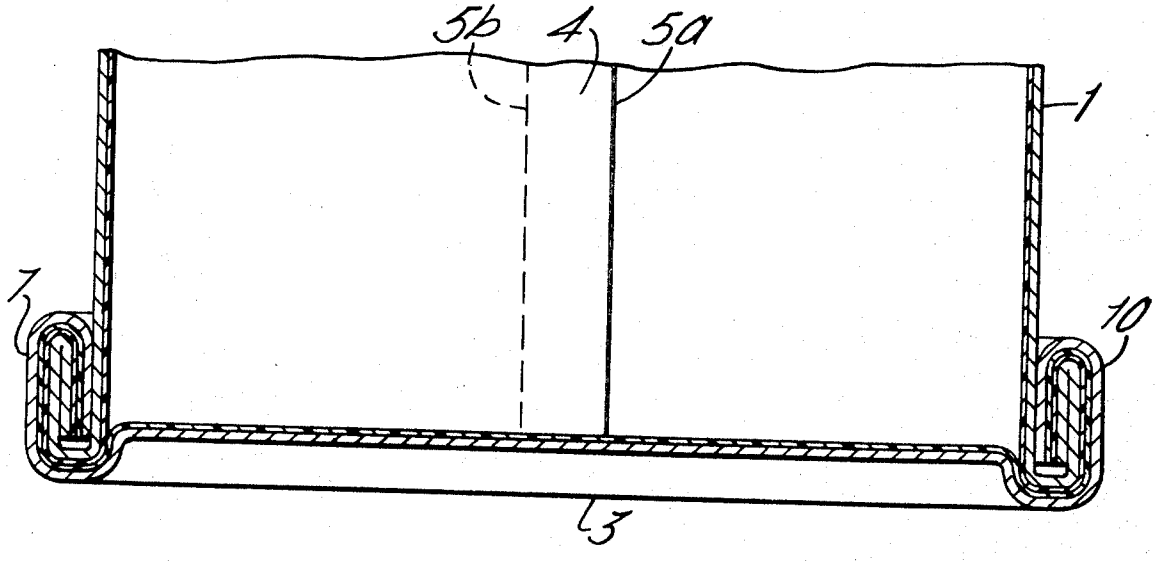


FIG. 1.

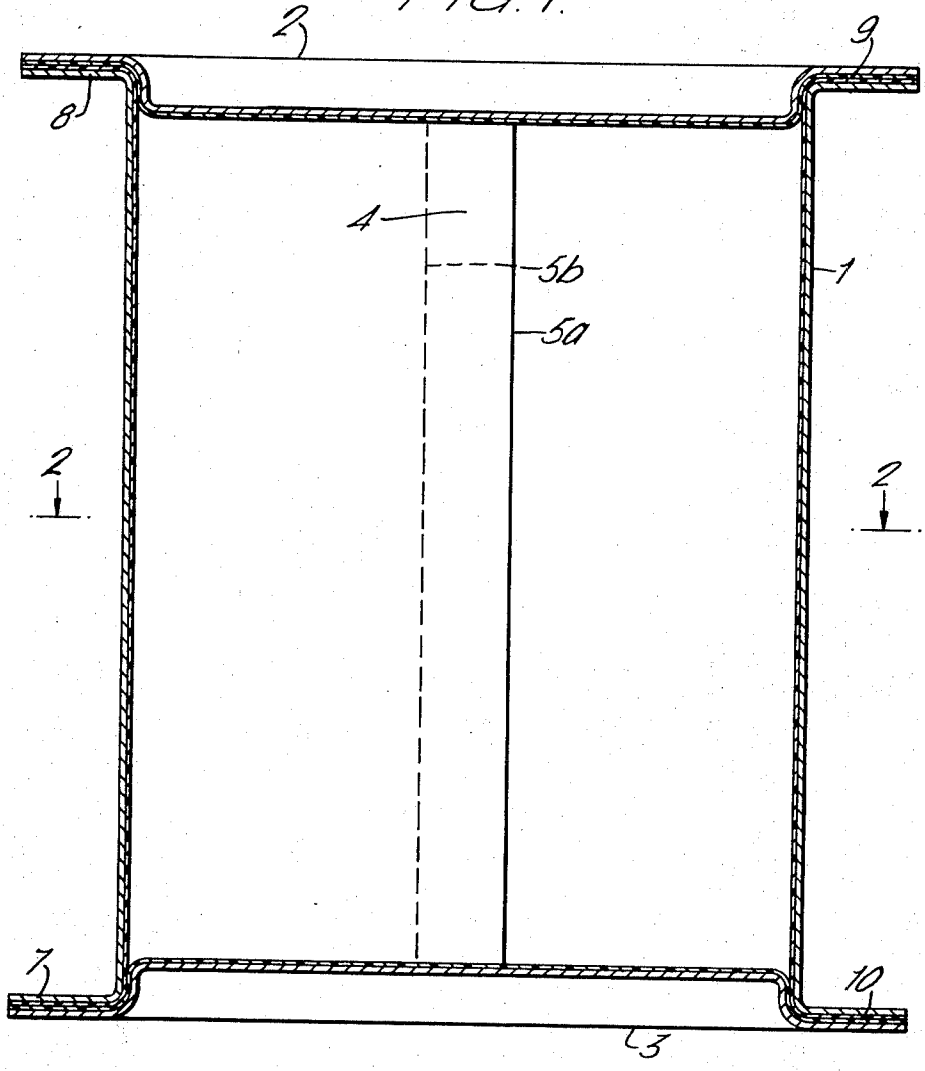


FIG. 2.

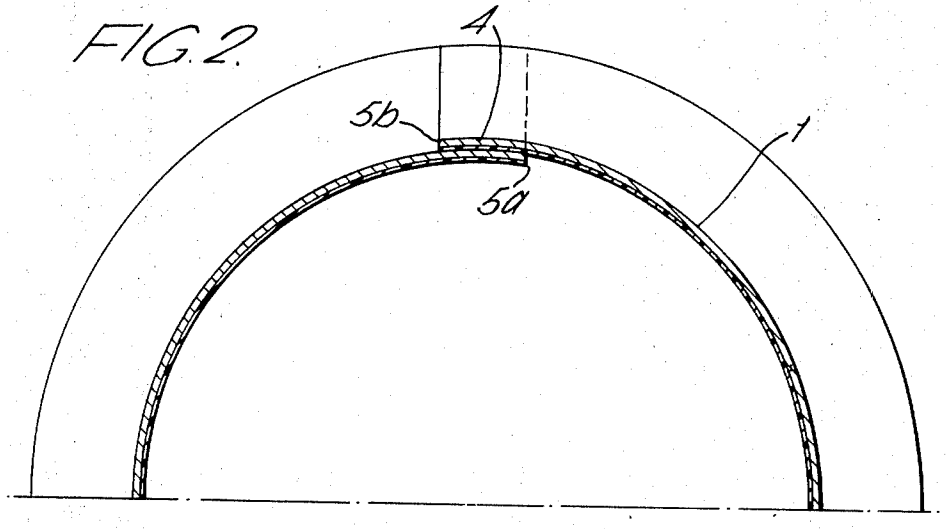


FIG. 3.

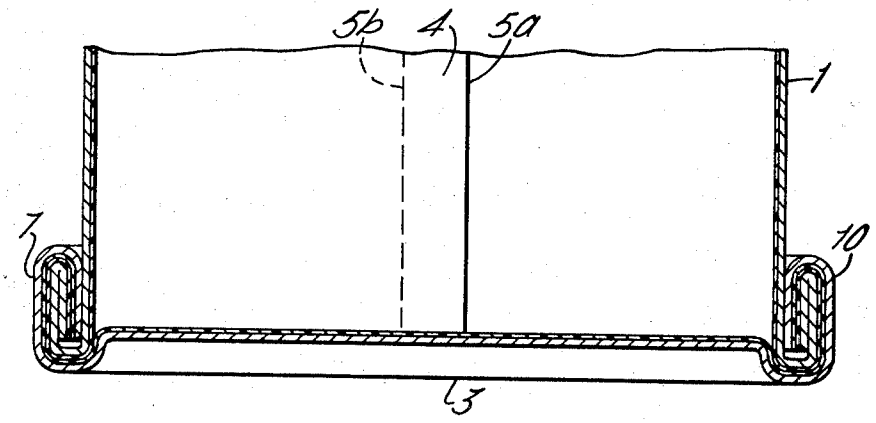


FIG. 4.

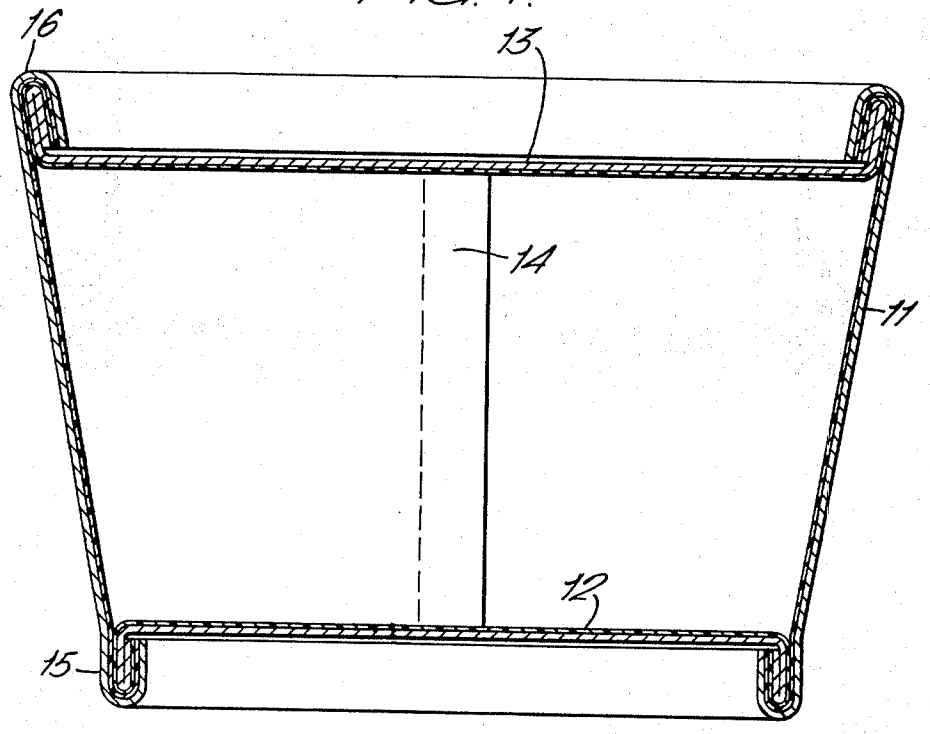


FIG. 5

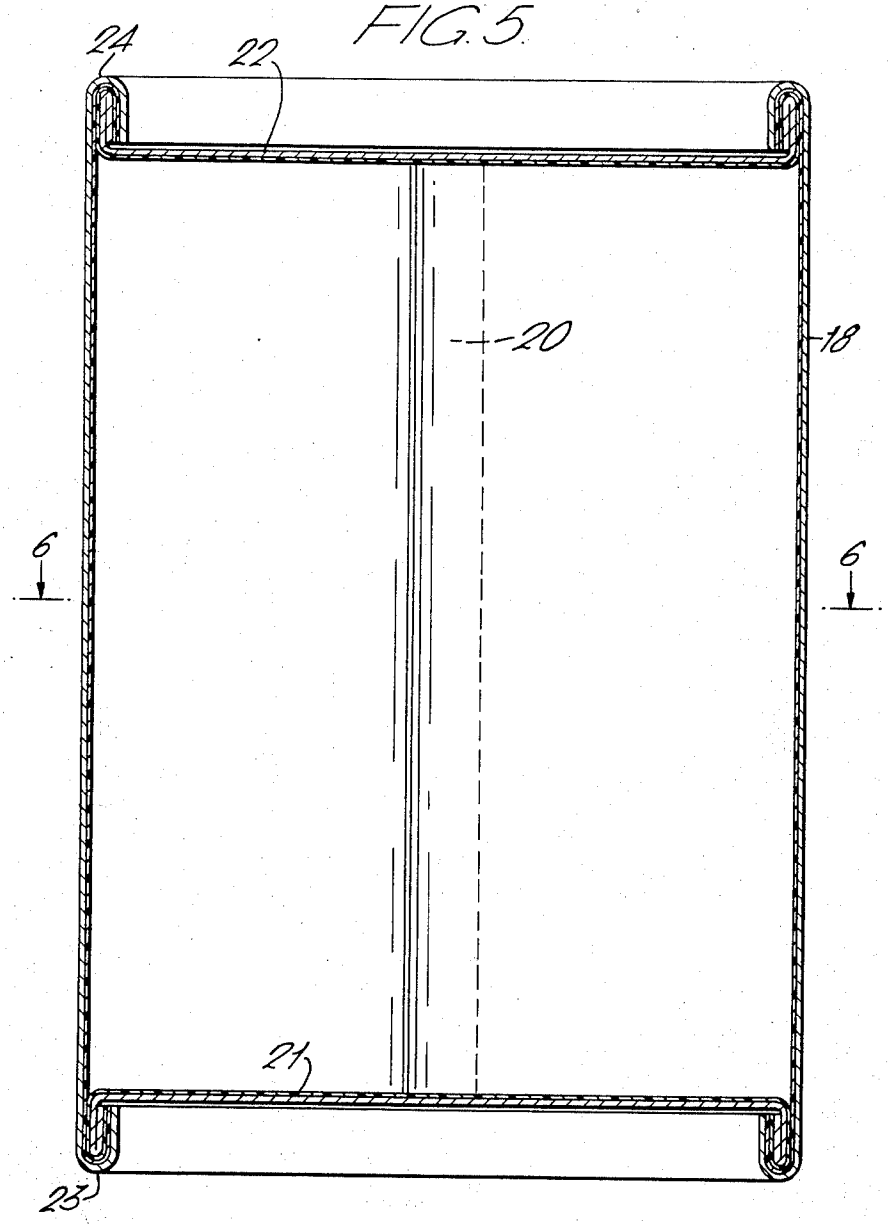
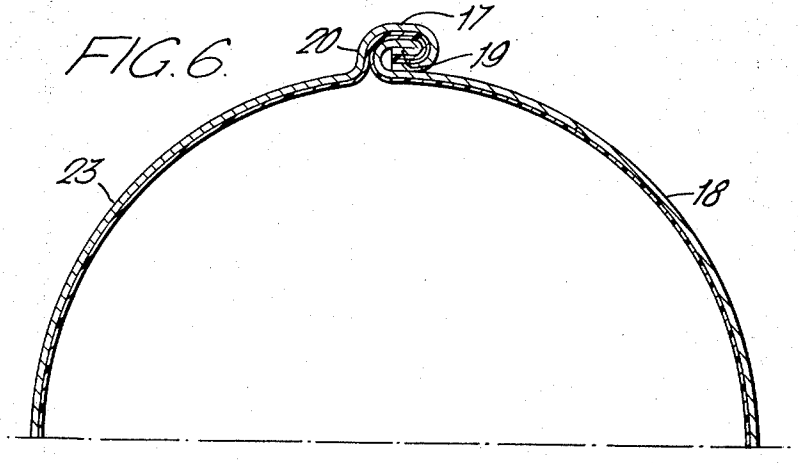


FIG. 6



CONTAINER

The invention relates to a rigid, three-piece, sterilizable can for foods.

The rigid sterilizable can most frequently used at present for foods is made from tinplate. Tinplate cans have several disadvantages, however, e.g., relatively high weight, which is tiresome in transit and also for the housewife when she is shopping. In particular, when used for preserving contents which react strongly with the container, such as tomato ketchup or fruit juices, it has been found that the keepability of the contents and particularly the durability of the soldered seams can be guaranteed only for a limited time, despite careful manufacture and good plating of the tin. It is also impossible to open such tinplate cans without a tool or a special opener, which is inconvenient and an additional expense. A further disadvantage is that these cans are difficult to dispose of after use, as they are difficult to compress, which causes special refuse problems.

Also known are aluminum sheet or plastics-coated aluminum cans made either by deep-drawing or flow-moulding. For obvious reasons, however, these cans can only be lacquered and printed after manufacture, it being also necessary for the flow-moulded cans to be specially degreased and trimmed along the upper edge before lacquering and printing. This expensive procedure is therefore adopted only for high-class cans. Cans where the height is substantially greater than the diameter cannot be manufactured economically by the deep-drawing process because such cans would have to be made in several stages, which is not economically viable in most cases.

A very economical, relatively new method of sealing cans and bags made from plastic-coated aluminum sheet or foil is "heat-sealing." This consists mainly in placing the sections of metal foil to be joined one on top of the other with the plastics sides together and heating them briefly under pressure along the seam to be formed to approximately 70° to 180° C depending on the type of plastics used which heating welds the plastics material along the heat-seal seam. This welding of the plastics coating of a plastics-laminated aluminum sheet along the welded seam is called "heat sealing" and the seam produced is a "heat-sealed seam."

Soft packs in the form of bags sealed by this method are already familiar. Such bags are difficult to stack, however, cannot bear a load and are not shape-retaining, all of which causes damage to mechanically sensitive contents and crease areas appear, so that they are not gas proof.

The invention is based on the problem of making a stackable, sterilizable, shape-retaining rigid can for foods out of coated aluminum sheet. It should be possible to print the sheet from which the can is formed as it comes off the roll, before the can is manufactured.

It is very difficult to meet this requirement as various conditions must be met both for the coated aluminum sheet itself and its coating or lamination, which is to form the lining of the inside of the can; most known composite materials cannot simultaneously meet all these conditions, which are conflicting in some cases.

The composite material must be sufficiently rigid to ensure the desired degree of shape retention in the finished container. The aluminum sheet of this composite material must, however, also be sufficiently flexible to enable it to be coated or laminated from the roll with the plastics material before or after printing. The coating must be sufficiently corrosion-resistant and free of pores to withstand the chemical action of the contents of the can, to protect the aluminum from this action and also to be heat-sealable. The coating should also have sufficient thermal resistance to be able to withstand the relatively high temperature of at least 121° C for at least 20 minutes necessary for sterilization without de-lamination of the composite material, decomposition of the plastics layer or damage to the sealed seam.

It was found that in order to meet these various requirements the first necessity is to use aluminum sheeting of a certain thickness and certain tensile properties. The 50–200 μ thick aluminum sheet to be used according to the invention should have a rigidity of at least 30 cm p, preferably higher than 50 cm p, measured by the Schlenker method. With the thickness of sheet according to the invention of 50–200 μ, preferably about 80–150 μ, the tensile strength β should be at least 10 kg/sq.mm, preferably at least 15 kg/sq.mm and the yield point 0.2 should be at least 7 kg/sq.mm, preferably approximately 10 kg/sq.mm. If these conditions are met, the aluminum sheet is still sufficiently flexible to be unwound from the roll as a strip at high speed and further processed, and still produce cans with sufficient rigidity.

It was also found that of all the known composite aluminum materials only a certain sub-group of aluminum sheets coated or laminated with polyolefins is suitable for solving the problem according to the invention. These are the aluminum sheets coated with low-pressure polyolefins. Of these low-pressure polyolefins, isotactic low-pressure polypropylene is most suitable for the purpose according to the invention.

In order to give a heat-sealable, pore-free coating with sufficient mechanical and chemical resistance, the low-pressure polyolefin layer on the inside of the can must be approximately 20–70 μ thick. Coatings or laminations approximately 50 μ thick are best, on the whole. The body seam joining the body to the base and lid sections are, in all cases, heat-sealed seams of polyolefin on polyolefin, preferably isotactic polypropylene on isotactic polypropylene. The body seam may be formed either by lapping aluminum sheeting coated or laminated on both sides with polyolefin or by a turned seam, where inner layer is sealed against inner layer.

In order to prevent corrosion of the cut edges of the body seams they can be given an additional plastics coating by a known method. The sterilizable canned goods containers rolled according to the invention may be cylindrical or multi-angular prismatic, or in the form of a truncated cone or pyramid. The lid and base section, to be joined to the body section rolled from coated aluminum sheeting according to the invention, may be in many forms and materials. It is possible to use both plastics-coated and plastics-laminated aluminum, as well as plastics material alone.

Embodiments of the preserved goods container according to the invention are described more fully below with the aid of schematic drawings.

FIG. 1 shows a longitudinal section through a cylindrical can with a sealed seam on the body and sealed-

on base and lid sections before completion of the base section by folding.

FIG. 2 shows the section of a can vertical to its longitudinal axis.

FIG. 3 shows 2 double-folded flanges of the base section of a cylindrical, sealed can in longitudinal section.

FIG. 4 shows the longitudinal section of a can in the shape of a truncated cone.

FIG. 5 shows the longitudinal section of a cylindrical can with sealed and folded body seam and recessed base section.

FIG. 6 shows the section of a cylindrical can vertical to its longitudinal axis with sealed and folded body seam and recessed base section.

To make the cans described in detail as examples with the aid of the figures, aluminum sheeting 120 μ, thick, with a tensile strength of 14 kg/sq.mm and a yield point of 11 kg/sq.m. was used, coated on both sides with a 50 μ layer of isotactic low pressure polypropylene.

The can illustrated in FIGS. 1–3 consists of a rolled body section **1** with a lap seam **4** with edges **5***a* and **5***b*. At the upper and lower edges of the body, flanges **7** and **8** are bent outwards. The base **3** and the lid **2** are sealed on to the flanges **7** and **8**. This gives the sealed seams **9** and **10**. After sealing, the flanges **7** and **8** are double folded, for example, so that they lie snugly against the body section, as shown in FIG. **3** for the base section.

FIG. **4** shows a can in the shape of a truncated cone with body section **11** and base and lid sections **12** and **13**. A body seam **14** and base and lid seams **15** and **16** are also shown. Manufacture is analogous with that for the cylindrical can shown in FIGS. **1–3**.

A further embodiment of the can is shown in FIGS. **5** and **6**. According to these FIGS. **5** and **6** the can consists of a rolled body section **18** with strips **17** and **19** bent outwards which strips are sealed to each other so that inner coating rests against inner coating. The sealed and folded seam forms the body seam **20**, as shown in FIG. **6**.

The recessed base section **21** and the lid section **22** are joined to the body **18** by the bonded seams **23** and **24**. The seams are made by a method analogous to that for the cans previously described.

The advantages achievable by means of this invention consist in particular in that it is now made possible to make especially slim and tall cans from aluminum blanks pre-printed by the rotary intaglio method.

Because the cans are made from punched out sheets of coated aluminum, uniform thickness is obtained and especially thin walls can be used. This means a considerable saving in weight. By contrast with the deep-drawing process, the aluminum sheet of the rolled can remains evenly coated and a particularly corrosion-resistant product is therefore obtained. In addition the small amount of space required by the can illustrated in FIG. **4** is an advantage, because the finished cans may easily be stacked one inside the other when empty.

What is claimed is:

1. A sterilizable can for foods comprising a body section which is rolled from aluminum sheeting whose thickness is in the range 50 to 200μ, which has at least on its inner side a layer of an isotactic low-pressure polypropylene whose thickness is in the range 20 to 70μ, and is provided with a side seam which is a heat-sealed bond of said polypropylene on polypropylene; and lid and base section also of said polypropylene coated aluminum sheeting and attached to said body section by seams which are heat-sealed bonds of polypropylene on polypropylene.

2. A sterilizable can according to claim **1** in which the thickness of the aluminum sheeting lies in the range 80 to 120 λ.

3. A sterilizable can according to claim **1** in which the thickness of the polypropylene layer is substantially 50 μ.

4. A sterilizable can according to claim **1** in which said aluminum sheeting has a tensile strength of at least 10 kg/sq mm. and a yield point of at least 7 kg/sq mm.

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