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R. P. BIGGER

2,303,322

FIBROUS CONTAINER MANUFACTURE

Filed March 8, 1941

Fig 1

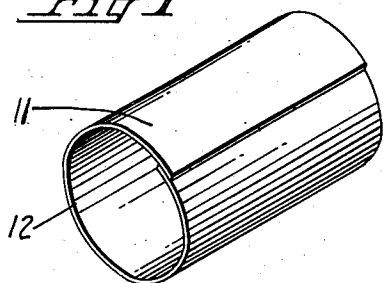


Fig 2

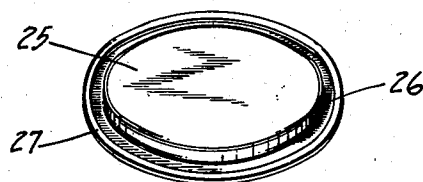


Fig 3

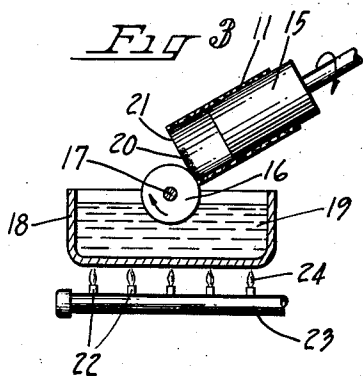


Fig 4

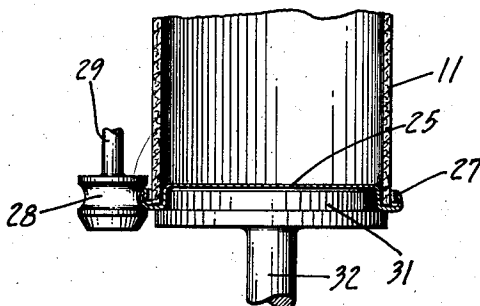


Fig 5

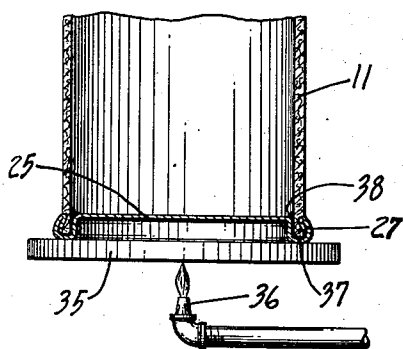
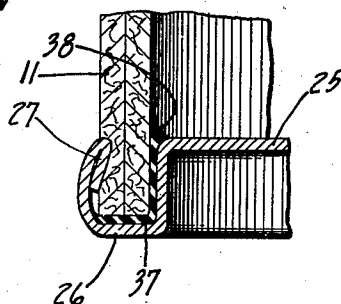


Fig 6



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## UNITED STATES PATENT OFFICE

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## FIBROUS CONTAINER MANUFACTURE

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4 Claims. (Cl. 93—55.1)

The present invention relates to a process of forming containers with a fibre body and metal ends and has particular reference to obtaining leaf-proof end seams for such containers which are oil and grease proof and which are adaptable for holding lard, vegetable and mineral oils and similar products.

In using containers made with fibre can bodies and fibre or metal ends for oil and greasy products no great difficulty is experienced in properly preparing the body wall or if a fibre end is used in preparing the fibre end so that such wall will prevent penetration of the product through the wall structure. Obviously, in the case of metal ends which are impervious to oil seepage no special treatment of the end stock will be necessary. However, the seams in such a container are far more difficult to make tight and the end seams between the body and its bottom and top ends are particularly vulnerable.

The present invention is particularly directed to overcoming leaky seam difficulties and contemplates a procedure by which such seams or joints are made fully secure so that oil and greasy contents sealed into the can are prevented from passing through the seam by seepage or otherwise. It follows that containers otherwise adaptable to contents of this nature and which embody end seams which are tight enough to resist any oil seepage and otherwise properly made as in the present method steps make the containers satisfactory for holding difficult materials such as lard or vegetable and mineral oils, etc.

An object of the present invention is the provision of a method of providing in fibre containers end seam joints between can bodies and can ends which are impermeable to the passage of oily or greasy products sealed in the containers.

Another object is the provision of a method of forming oil and grease proof joints between fibre can bodies and metal ends so that the container will hold lard or vegetable and mineral oils and like products without danger of leaking.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a perspective view of a fibre can body which has been treated to make the body wall impervious to the seepage of oily and greasy products, such a body being subjected to method steps embodied in the present invention;

Fig. 2 is a perspective view of a metal can end

member which constitutes a part of a container made with such a body;

Fig. 3 is a schematic sectional view of apparatus for applying a sealing mixture to the inside surface adjacent an end of the can body of the type shown in Fig. 1 and illustrating the application of such sealing material by rotation of a roller in a bath containing the sealing material;

Fig. 4 is a schematic view in section illustrating an assembled fibre can body and a metal end or bottom member and showing a seaming roller for crimping the flange of the can end onto the fibre body;

Fig. 5 is a schematic view in section of a heating element for heating the seam joint of a container after the body and end members have been secured together; and

Fig. 6 is an enlarged sectional view of the lower corner of a fibre container and metal end embodying an end seam or joint and illustrating the results of the final steps in the present method.

A suitable fibre container body 11 (Fig. 1) may be formed in a conventional manner as by a laminated or spiral winder such as is used in fibre tube and fibre can manufacture. The body 11 produced in such conventional manner is formed of a plurality of wall sections or layers 12 held together by a suitable cement. Such a can body to be suitable for the purposes described previous to the performance of the first step in the present method has been oil and grease proofed in any one of several satisfactory ways by means of which the body wall is made impervious to the seepage of oil or grease.

In the practice of the present invention such a can body 11 may be inserted on or telescoped over a rotating mandrel 15 (Fig. 3) so that the lower end of the body almost or lightly engages an applying roller 16. Roller 16 preferably rotates with its horizontal shaft (designated as 17) which is arranged above a tank 18, in which the sealing mixture indicated by the numeral 19 is contained. Such an applying roller 16 is rotated in a clockwise direction (as viewed in Fig. 3) and a portion of the mixture 19 from the tank 18 is brought up on the surface of the roller and is deposited inside of the lower edge of the can body 11 as it rotates with the mandrel 15.

By reason of the rotation of the can body 11 and the rotation of the applying roller 16 a thin film or stripe of sealing material is deposited as a strip 20 on the inner wall of the body and also as an edging strip 21. The sealing mixture 19 in the tank 18 is maintained at

an elevated temperature, preferably at about 225° F. to 240° F. by means of a suitable heating arrangement which may include burners 22 carried on an oil supply pipe 23. Heating flames 24 maintained by passage of the oil with suitable air, through the burners 22, heat the tank sufficiently to raise the temperature of the sealing mixture contained within the tank to the desired temperature.

This sealing mixture is thermoplastic and is in heated condition when it is applied to the can body to form the liner strip 21. It cools down sufficiently to solidify as it builds up the strips 20 and 21. A suitable mixture may contain the following ingredients:

|                       | Per cent |
|-----------------------|----------|
| Hydrogenated oil..... | 36       |
| Amorphous wax.....    | 36       |
| Corn oil.....         | 18       |
| Castor oil.....       | 10       |

The hydrogenated oil is oil proof and is made by hydrogenating cotton seed, soya bean, peanut oil, castor oil or fish oil. The corn oil may be replaced by any suitable semi-drying oil such as rape seed oil. The castor oil in the mixture is utilized as a plasticizer. The manner of producing such a mixture is not of the essence of the present invention and further description as to this is thought unnecessary.

Following the application of the lining strip 21 to the inner edge of the can body 11 this end of the can body is assembled with a can end. Fig. 2 illustrates a suitable metal can end 25 which is formed with the usual seaming flange 26, the outermost edge of the flange being preferably bent back in a hemmed curl 27 (see also Fig. 6). In assembling can body and end, the former may be inserted in the groove of the flange 26 of the end as illustrated in Fig. 4.

The assembled parts are then subjected to a crimping operation by means of which the hemmed edge of the flange is bent inwardly against the body wall. This bending or crimping action may be performed by a suitable crimping roller 28 mounted on a shaft 29, the can end at such time being properly held on a chuck 31 mounted on a shaft 32. This bending of the can end flange is a crimping operation and forcibly squeezes the end of the can body 11 within the can end, as illustrated in Fig. 6. In this sealed condition the sealing strips 20 and 21 are confined between the adjacent sections of the can end and the fibre body.

After the can end has been crimped in position on the can body, the assembled body and end are subjected to a further treatment as by being placed on a hot plate 35 (Fig. 5). Such a plate is maintained in heated condition as by a gas burner 36, by means of which the plate is maintained preferably at a temperature of substantially 300° F. This temperature is sufficiently high to again reduce the thermoplastic sealing mixture in the strips 20 and 21 to fluid condition. At this time the mixture flows downwardly between the body and end walls, filling in all of the spaces and effecting a tight end seal or joint 37 (Fig. 6) for the can. A small fillet 38 of the sealing material forms at the inner junction between the body wall and the upper enclosed part of the can end. This is additional insurance against any penetration into the seam of oil or grease contents which may be subsequently packed in the can.

It is thought that the invention and many of

its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the process hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of forming an oil and grease leakproof end seam between a can body and a can end of a fibrous container suitable for lard, vegetable and mineral oils and the like, which comprises applying an oil and grease proofing thermoplastic sealing mixture to the inner wall of the can body adjacent its end edge, inserting such body end edge into the flange of the can end, bending the can end edges so as to clamp the same over the end of said body to produce an end joint within which said applied sealing mixture is confined, as a plastic mass in the space between the inner wall of the can body and the adjacent can end wall and between the end edge of the can body and the adjacent can end wall and heating the said joint to produce liquefaction of the confined thermoplastic sealing mixture whereby the same flows into and fully fills all spaces between the can body and the can end which are included in said end joint.

2. The method of forming an oil and grease leakproof end seam between a fibrous can body and a metal end of a container suitable for lard, vegetable and mineral oils and the like, which comprises applying a heated, liquefied oil and grease proofing thermoplastic sealing mixture to the inner wall of the fibrous can body adjacent its end edge so that such mixture solidifies on the body interior wall, inserting the body end edge into the flange of the metallic can end, bending the can end edges so as to tightly squeeze the same over the end of said body to produce an end joint within which said solidified sealing mixture is confined, as a plastic mass in the space between the inner wall of the can body and the adjacent can end wall and between the end edge of the can body and the adjacent can end wall and heating the said joint to produce liquefaction of the confined thermoplastic sealing mixture whereby the same flows into and fully fills all spaces between the can body and the can end which are included in said end joint.

3. The method of forming an oil and grease leakproof end seam between a fibrous can body and a metal can end of a container suitable for lard, vegetable and mineral oils and the like, which comprises applying a heated oil and grease proofing thermoplastic sealing mixture while in liquid form to the inner wall of the fibrous can body adjacent its end edge, said sealing mixture which sets on cooling consisting of hydrogenated oils and amorphous waxes and a semi-drying oil, assembling said can body and its can end by disposing the said body end edge with its solidified sealing mixture within the peripheral flange of the can end, spinning the edge of the can end flange into tight engagement with the said can body wall so that the said sealing mixture on the body is confined inside of the spun edge of said can end in a formed end joint, and heating said joint to soften said confined thermoplastic mixture whereby the same flows into and fully fills all spaces in the joint between the can body and the can end thereby producing a leak-proof seam.

4. The method of forming an oil and grease

leaf-proof end seam between a fibrous can body and a can end closure of a container suitable for lard, vegetable and mineral oils and the like, which comprises applying a stripe of thermoplastic sealing material while in liquid form to the inner wall of said body adjacent an end thereof while simultaneously applying another stripe of said thermoplastic sealing material in liquid form to the raw edge of said body and contiguous to said inner wall stripe, permitting said stripes on said body to solidify, inserting said body end into a flange of said end closure, bending the closure edges so as to clamp the same over and inwardly

5 against the end of said body to produce an end joint in which said raw edge stripe and a portion of said inner wall stripe are confined, and heating the said formed end joint to produce liquefaction of the thermoplastic sealing material whereby the same flows into the spaces between the can body and the closure which are included in said end joint, the portion of said inner wall stripe not included in said joint as a result of said bending and heating operations forming a protecting fillet to prevent penetration of the container contents into the end joint so formed.

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