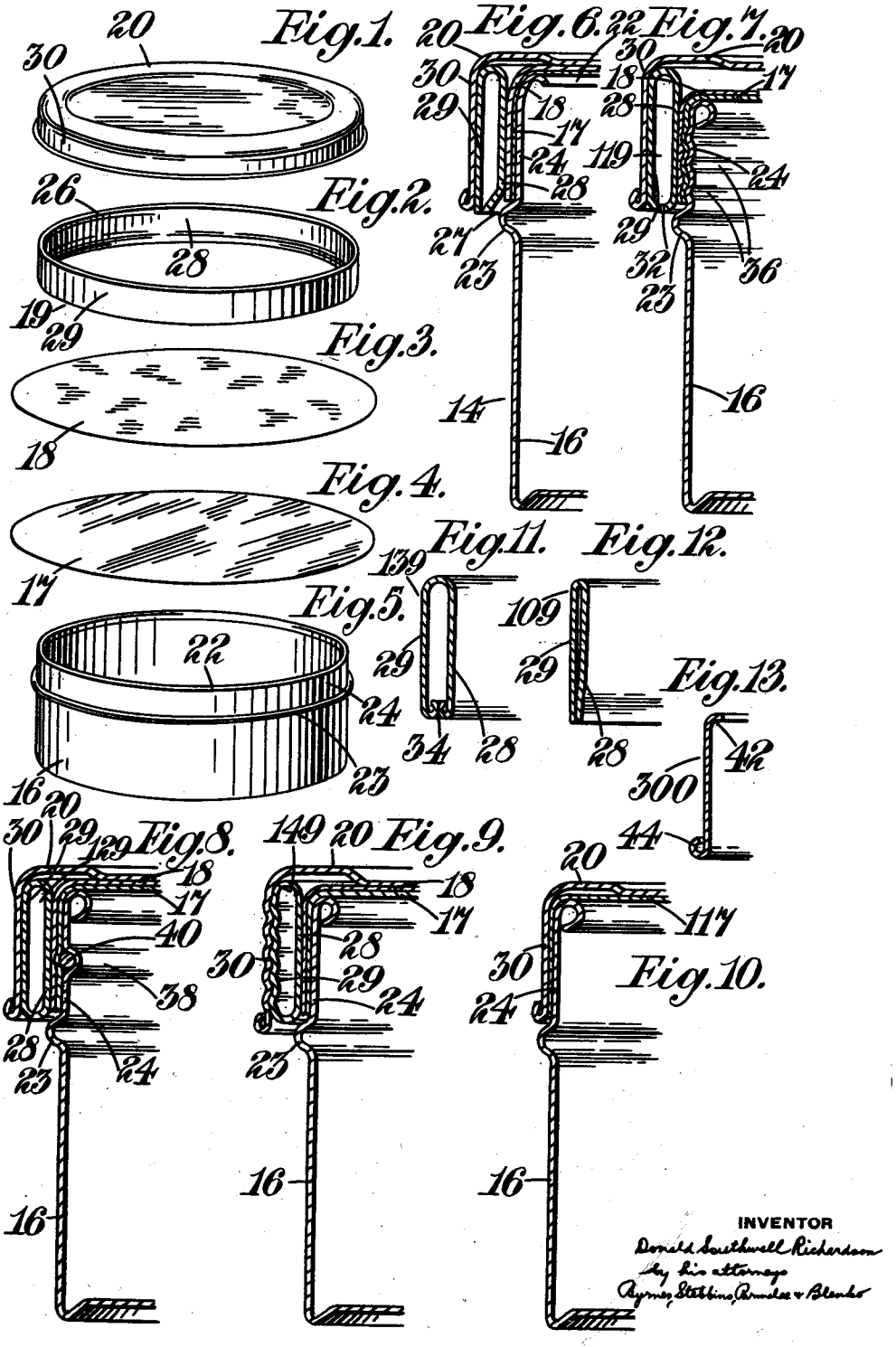
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HERMETICALLY SEALED TIN AND OTHER CONTAINER AND METHOD OF SEALING THE SAME

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HERMETICALLY SEALED TIN AND OTHER CONTAINER AND METHOD OF SEALING THE SAME

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This invention is for improvements in or relating to hermetically sealed tins, bottles and other containers of the type wherein a seal in the form of thin sheet material, e. g. metal foil, is held in its closing position on or in the mouth of the container by an annular member which clamps the marginal portion of the seal against an annular portion of the container. In hermetically sealed containers of this type known heretofore the clamping annular member was usually constituted by a flange on a cover or lid which served for closing the container.

One object of the present invention is to provide an improved method of sealing containers of the type described, and another object is to provide an improved construction of such containers which can be opened more easily than some containers of the same type proposed heretofore, and which entail a reduced cost of sealing the container as compared with soldering.

According to the invention, there is provided in a hermetically sealed container, a container body, a seal of thin pliable sheet material closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged, said clamping ring being irremovably united with said body.

This arrangement enables flanged lids of standard size to be detachably carried by the outer wall of the clamping ring, which outer wall retains its original predetermined diameter during the clamping operation, while the inner wall of the clamping ring expands to accommodate the sealing material between it and the outside of the mouth of the container.

The seal preferably comprises a plurality of superposed sheets of thin pliable material, at least one of which sheets may be metallic, and at least one non-metallic. This arrangement not only facilitates the sealing operation, but permits the seal to be fractured more readily than a seal consisting of a single sheet of the equivalent thickness.

Preferably the clamping ring is of substantially oval cross-section and has its wall bevelled at its edge which lies nearer the bottom of the container body, to facilitate placing the ring on the mouth of the container and drawing the sealing material around the mouth.

Several embodiments of the invention are diagrammatically illustrated by way of example in the accompanying drawing, wherein:

Figures 1, 2, 3, 4 and 5 are perspective views respectively showing a lid, an annulus, a metal foil disc, a regenerated cellulose disc, and a body of one form of a container or tin, according to the invention, and

Figure 6 is a vertical section, showing part of a hermetically sealed container formed by assembling the parts shown in Figures 1 to 5;

Figures 7, 8, 9 and 10 are vertical sections showing parts of other forms of containers or tins, according to the invention, and

Figures 11, 12 and 13 are detail sectional views showing modified forms of annulus described hereinafter.

Like reference characters designate like parts throughout the several figures, which are not drawn to scale, as the thickness of the sealing material has been exaggerated in the sectional views.

Referring first to Figures 1 to 6, a container or tin 14, such as may be used for receiving a typewriter ribbon, comprises a body portion 16, two pieces of thin sheet material 17, 18 constituting a seal, an annulus 19 and a cover or lid 20. The body-portion has an inner bead 22 at its upper margin for stiffening the mouth and has an outwardly directed peripheral bulge 23 or bead spaced away from the top serving for stiffening the container. This bulge or bead 23 is situated at the bottom of the annular portion or neck 24 of the container for receiving the annulus 19. In some cases more than one such bulge or lower bead 23 may be provided for obtaining greater stiffness, and they may be formed inside or outside the container.

The two sheets of thin sealing material 17, 18 are placed over the mouth of the container with their marginal portions extending on all sides beyond the same. Preferably, the lower sheet 17 is composed of regenerated cellulose, and the upper sheet 18 of metal foil, e. g. tin or aluminium. In some cases the seal may be constituted by a single sheet of thin material, e. g. metal, such as tin or aluminium foil, regenerated cellulose or the like, but if desired, a combination of metal and regenerated cellulose, or other convenient material may be used.

The annulus 19 may be made from a strip of sheet material, e. g. metal, such as iron, whereof the width is rather more than twice the depth of the annulus, which strip is folded over upon itself along a line lying parallel with the direction of its length, and has its ends joined together, so as to provide the ring 19, whereof that edge 26 which will be uppermost on the body 16, is rounded. One marginal longitudinal portion of the strip is also preferably bent somewhat, so as to provide a bevelled or slanting face 27 in the annulus, as shown in Figure 6, at the lower edge of the ring 19. The annulus or ring 19 thus comprises two annular members, whereof one is an inner wall 28 for pressing the seal against the neck 24 of the tin, and the other is an outer wall 29 for receiving the flange 30 of the lid 20, which inner wall has the slanting face 27.

These two walls 28, 29 of the annulus may be spaced apart a distance considerably greater than the total thickness of the two walls, as shown in Figure 6, or, alternatively, as shown in Figure 12, the two walls 28, 29, of a modified annulus 109 may lie close to one another. Further, a hollow annulus 119 may be made as shown in Figure 7 in which the joint 32 at the bottom is a butt joint, or, alternatively, the annulus 129, as shown in Figure 8, may be formed by joining together the ends of a tube of oval section. Figure 11 shows yet another modified form of annulus 139 which differs from the annulus 19 described above, in that the longitudinal marginal portions of the strip from which it is formed, are bent into U shape so as to be inturned into the annulus, and to form beads within the latter at its lower edge as shown at 34.

In order to localize the pressure of the annular member on the seal over relatively small annular areas on the neck of the container, one or more outwardly projecting ribs may be formed on the outer periphery of the neck of the container by making corresponding grooves 36 within the neck and pressing the material of the neck outwards, as shown in Figure 7. When the annular wall 28 of the annulus clamps the foil in position on such a ribbed neck, the pressure is taken up by the ribs locally and effective sealing occurs on each such rib over which the sealing material is drawn.

As shown in Figure 8 a groove 38 may provide a channel in the outer face of the neck 24, which channel may contain a rubber ring 40 or other gasket for forming a fluid-tight fit with the inner wall 28 of the annulus.

As shown in Figure 9, the outer peripheral wall 29 of the annulus 149 may be screw-threaded to receive the lid 20, whereof the flange 30 is also screw-threaded. In some cases a press cap may be carried by the annulus, or, alternatively, the lid may be detachably attached to a hollow annulus by means of a bayonet joint. The use of a hollow annulus is advantageous apart from the the fact that it is very stiff and yet can be distorted locally to accommodate the sealing material, in that it can be maintained with a predetermined correct outside diameter when being forced on to the container and after it has been forced into position. This is important when slip-on or plain lids are used with it, as the tool used for forcing the annulus on to the container can size the outside of the annulus without interfering with the seal by swaging it to its original diameter before assembling, or smaller if necessary in order to accommodate the lid. Other operations can also be performed on the outside of the hollow annulus after or during its assembly to permit of any desired form of lid to be used.

A container sealed according to the invention and having a slip-on or plain lid 20, whereof the flange 30 constitutes the annulur member aforesaid, is shown in Figure 10. In this construction the marginal portion of a single sheet 117 of sealing material, e. g. metal foil, regenerated cellulose or the like, is secured in position between the flange 30 and the neck 24 as described above, whereby the container is hermetically sealed.

In some cases a ring or annulur member 300 as shown in Figure 13 may be used for clamping one or more thicknesses of sealing material in position on the neck of the container. This ring 300 may have an inturned lip 42 at its upper end and an outer body 44 at its lower end, and may be similar to the flange 30 of the lid 20 after the greater part of the end wall of the lid has been removed. Such a ring 300 may itself carry a lid 20, which will preferably make a sliding fit with it.

In order to provide for the expansion for accommodating the thickness of the seal interposed between the gripping faces of the annulur member and the co-operating annulur portion of the container, one of these parts must be made of expansible material, e. g. metal, if the other is made of non-expansible material, e. g. glass, a phenolic condensation product, a cellulose ester or the like.

If the annular member is a force or press fit with the neck of the container without the seal between them, then the entire thickness of the compressed sealing material will be accommodated by a change in size of the annulus or the neck or of both these parts. The relative size of the annulus and neck may, however, be such that when the sealing material is not between them, they fit loosely one on the other, whilst when being assembled with the sealing material between them, only a part of the thickness of the sealing material is accommodated by the change in size of the annulus and/or the neck. In some cases the annular member to lie outside the neck of the container may at first be of smaller diameter than the neck in order to provide maximum pressure on the seal when being forced into position. Alternatively, if the annular member is to lie in the neck it may at first be of larger diameter than the neck.

The invention is applicable for sealing not only tins, but also bottles, moulded vessels, earthenware jars and other containers.

Various modifications may be made in the details of construction described above without departing from the invention. For example when the annular member and seal are both accommodated within the neck of the container, the bead 22 at the mouth of the container will lie outside the same, and the bead 44 on the ring 300 will lie inside the ring. Instead of the irregular surface aforesaid being provided on the neck of the container by means of grooves 36 or the like as shown in Figure 7, said irregular surface or formation may be provided on the annular member, such as the inner wall 28 of a hollow annulus. Also in some cases both of these parts may be of irregular formation.

In some cases paper which is waxed or varnished and is acid-resisting, may be used, with or without metal foil, particularly with glass containers.

I claim:

1. In a hermetically sealed container, a con-

tainer body, a seal of thin pliable sheet material closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged.

2. In a hermetically sealed container, a container body, a seal of thin pliable sheet material closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged, and a lid detachably carried by the outer wall of the clamping ring.

3. In a hermetically sealed container, a container body, a seal comprising a plurality of superposed sheets of thin pliable material closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged.

4. In a hermetically sealed container, a container body, a seal comprising a plurality of thin pliable sheets of different materials superposed one on another closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged.

5. In a hermetically sealed container a container body, a seal comprising a plurality of thin pliable sheets of different material superposed one on another closing the mouth of said body and having its marginal portion lying outside the same, at least one of which sheets is metallic and at least one is non-metallic, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged.

6. In a hermetically sealed container, a container body, a seal of thin pliable sheet material closing the mouth of said body and having its marginal portion lying outside the same, a clamping ring of hollow formation having an outer wall of predetermined diameter and an expansible inner wall that clamps said marginal portion of the seal against the outside of said mouth, which inner wall and the co-operating outer face of the mouth are of such a size before being assembled that when forcibly assembled with the margin of the seal between them, the thickness of the interposed material is accommodated by the expansion of the said inner wall while the diameter of the outer wall remains unchanged, which clamping ring is of substantially oval cross-section and has its inner wall bevelled at its edge which lies nearer the bottom of the container body.

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