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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Plugs for Container Closures

We, RHEEM AUSTRALIA PTY. LIMITED, a company incorporated in the State of Victoria, of Brodie Street, Rydalmere, New South Wales, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to plugs of resilient plastics or other resilient materials adapted for closing the openings in drums or like containers.

For convenience the invention will be described with the plug used to close an opening in the top of a container.

Words such as "base" and "upwardly" should not be interpreted restrictively since the opening to be closed might be in the side or bottom of the container.

The most important factor relating to a drum closure is that it be completely leak proof. Otherwise contents are liable to escape during transit or handling and loss of contents can occur with perhaps more serious hazards being created.

Plugs wholly of plastics materials are known in the art but suffer certain defects as effective sealing means for various reasons, which normally necessitate the addition to them of a relatively costly separate gasket ring of rubber or the like.

For economy in material and production costs the known plug is formed as a hollow section but requires integral internally projecting lugs which serve to act as leverage for screwing the plug in and out of the opening. In addition, in order to add support to the vertical wall, reinforcing ribs are embodied.

As a result of this it has been found that during the moulding process to produce the plug, differential shrinkage and localised concentration of material about the lugs and ribs occur with the result that a degree of eccentricity and irregularity develops in the face of

the rim of the plug which seats upon the closure opening.

A second problem which is encountered in satisfactory sealing relates to the insert or flange which is adapted to the opening. This insert normally of steel, is partly screw threaded and has a plain cylindrical wall extending upward and curling over the extruded opening in the container. The curled portion acts as the base seating for the plug.

It has however been found that problems develop during the boring of the upper section of the flange wherein the original wall thickness is considerably reduced and true concentricity is difficult to obtain with the result that a certain amount of ovality occurs. This means that, after the upper wall, of the plug has been curled over the extruded container wall, there are irregularities in the seating face.

As a consequence it can be seen that with irregularities in both the plug seating face and the opening seating face, satisfactory seating of these components and final sealing of the closure is difficult to obtain economically.

It is therefore an object of this invention to provide a plug of a tough but resilient material such as polypropylene which will achieve the purpose of providing a substantially fully effective leak proof seal when applied to a container opening.

For convenience the invention will be described as applied to an opening in the upper end wall of an upright drum.

In one general form the invention is a resilient plastics or other resilient material plug having a transverse base wall, an upwardly extending approximately cylindrical side wall externally screw threaded around its lower end, a thickened upper end rim on the outside of the side wall the outside of the thickened rim being adapted to engage sealingly the adjacent upper surface of a flange secured in the container opening, and a continuous or discontinuous groove in the upper end surface of the rim extending at least part way around the rim.

The invention, in another general form is a resilient plastics or other resilient material plug having a transverse base wall, an upwardly extending approximately cylindrical side wall externally screw threaded around its lower end, a thickened upper end rim on the outside of the side wall with its lower outer part diverging upwards and its upper outer part converging upwards and an annular groove around the upper end face of the rim near its junction with its converging part.

In either of these forms the object of the invention is to provide a plug of resilient plastics or other resilient material, which, when applied to a container opening, ensures that the mating surfaces of the plug and container openings are in complete contact to provide an effective leak proof seal.

A preferred form of the invention will now be described with reference to the accompanying drawings in which:—

Fig. 1 is a plan view of a plug in accordance with the invention,

Fig. 2 is a sectional view on the line 2—2 of Fig. 1,

Fig. 3 is an enlarged view of portion of Fig. 2, and

Fig. 4 illustrates the plug applied to a container opening.

As seen from the drawings, the plug consists of a base 1, a vertically extending cylindrical side wall 2 terminating at 3, a laterally extending rim comprising a lower conical surface 4 and an upper conical surface 5, lugs 6 to receive a spanner for purposes of insertion and removal of the plug and reinforcing ribs 7, a portion of the vertical walls being screw threaded as shown at 8.

At the external junction of 3 and 5 is shown an annular groove 9. Whilst in no way affecting the stability of the spanner lugs or screwed wall section, the formation of this groove permits a degree of flexibility in the rim and consequently, as pressure is applied in inserting the plug, sufficient localised movement in the

plastics material is obtained to readily take up irregularities in either the plug surface or the container opening without the need to apply excessive pressure which could otherwise damage the thread or lug details.

As seen in Fig. 4, the groove 9 of Fig. 2 now represented at 9a, has been closed as pressure has been applied to insert the plug into the opening and effective sealing is obtained between surface 4 of plug and face 10 of flange inserted in opening. The groove 9 may be discontinuous.

WHAT WE CLAIM IS:—

1. A resilient plastics or other resilient material plug having a transverse base wall, an upwardly extending approximately cylindrical side wall externally screw threaded around its lower end, a thickened upper end rim on the outside of the side wall, the outside of the thickened rim being adapted to engage sealingly the adjacent surface of a flange secured in a container opening, and a continuous or discontinuous groove in the upper end face of the rim extending at least part way around the rim.

2. A resilient plastics or other resilient material plug having a transverse base wall, an upwardly extending approximately cylindrical side wall externally screw threaded around its lower end, a thickened upper end rim on the outside of the side wall with its lower outer part diverging upwards and its upper outer part converging upwards and an annular groove around the upper end face of the rim near its junction with its converging part.

3. A plug as in claim 1 wherein the groove extends completely around the rim.

4. A plug substantially as described in the specification and shown in the accompanying drawings.

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