PLUGS FOR CONTAINER CLOSURES

Melville J. Phillips, Epping, New South Wales, Australia, assignor to Rheem Australia Pty., Limited, Rydalmer, New South Wales, Australia, a corporation of Australia.

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ABSTRACT OF THE DISCLOSURE

A plastic closure plug for sealing the opening in the top of a drum container or the like in a leak proof manner is described. The plug includes a transverse base wall and an upwardly extending cylindrical side wall which is externally screw threaded at its lower end. A circumferential rim extends outwardly from the upper end of the side wall and defines a plug seating face adapted to seatingly engage a peripheral seat about the opening in the drum or the like. A circumferential groove extends into the upper end of the body portion at a location which is inwardly of the rim to permit inward flexing of the rim upon engagement of the rim with the seat in the opening so that any irregularities between the face and seat are accommodated to assure that a leak proof seal is obtained.

The following statement is a full description of this invention, including the best method of performing it known to us.

The invention relates to plugs of plastic materials adapted for closing the openings in drums or like containers. The term "plastic" is intended to include any resilient material suitable for the purpose of the invention.

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 plastic 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 occurs 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 a 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 plastic 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 wall, the outside of the thickened rim being adapted to engage seatingly 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 plastic 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 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 another form, the invention comprises a plug of plastic material which, when applied to a container opening, ensures that the mating surfaces of the plug and container opening 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 sidewall 3 and conical surface 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 plastic 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.

I claim:

1. A plastic closure plug adapted for sealing an opening in a drum or the like in a leak proof manner comprising a body portion having a substantially cylindrical outer surface which is externally screw threaded at its lower end and has a circumferential outwardly extending rim at its upper end defining a plug seating face adapted to sealingly engage with a peripheral seat about the opening in said drum or the like, the upper end of said body portion having a circumferential groove inwardly of said outwardly extending rim permitting inward flexing of said rim upon engagement of said plug seating face with said opening seat to accommodate any irregularities between said face and seat and assure a leak proof seal therebetween.

2. The plastic closure plug of claim 1 wherein said groove is a continuous groove extending completely around said body portion.

3. The plastic closure plug of claim 1 wherein the body portion of said plug includes a transverse base wall and an upwardly extending substantially cylindrical outer surface, said outwardly extending rim being a thickened rim portion at the upper end of said side wall.

4. The plastic closure plug of claim 3 wherein said groove extends into the upper end surface of said side wall.

5. The plastic closure plug of claim 3 wherein said thickened rim portion at the upper end of said side wall includes a lower outer circumferential part diverging outwardly in the upward direction to provide said plug seating face and an upper outer circumferential part converging inwardly in the upward direction and terminating in a generally transverse upper end surface, said groove being located in said upper end surface adjacent its junction with said upper outer part of said rim.

6. A plastic closure plug adapted for sealing an opening in a drum or the like in a leak proof manner comprising a body portion having a substantially cylindrical outer surface which is externally screw threaded at its lower end and has a circumferential outwardly extending rim at its upper end, said rim including a lower outer circumferential part which diverges outwardly in the upward direction to provide a plug seating face adapted to sealingly engage with a peripheral seat about the opening in said drum or the like and an upper outer circumferential part converging inwardly in the upward direction and terminating in a generally transverse upper end surface, and a circumferential groove extending into said upper end surface adjacent its junction with said rim upper outer circumferential part permitting inward flexing of said rim upon engagement of said plug seating face with said opening seat to accommodate any irregularities between said face and opening seat and assure a leak proof seal therebetween.

7. The plastic closure plug of claim 6 wherein said groove is a continuous groove extending completely around said body portion.

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THERON E. CONDON, Primary Examiner.
J. B. MARBERT, Assistant Examiner.