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(54) **TRANSIT SEALING PLUG**

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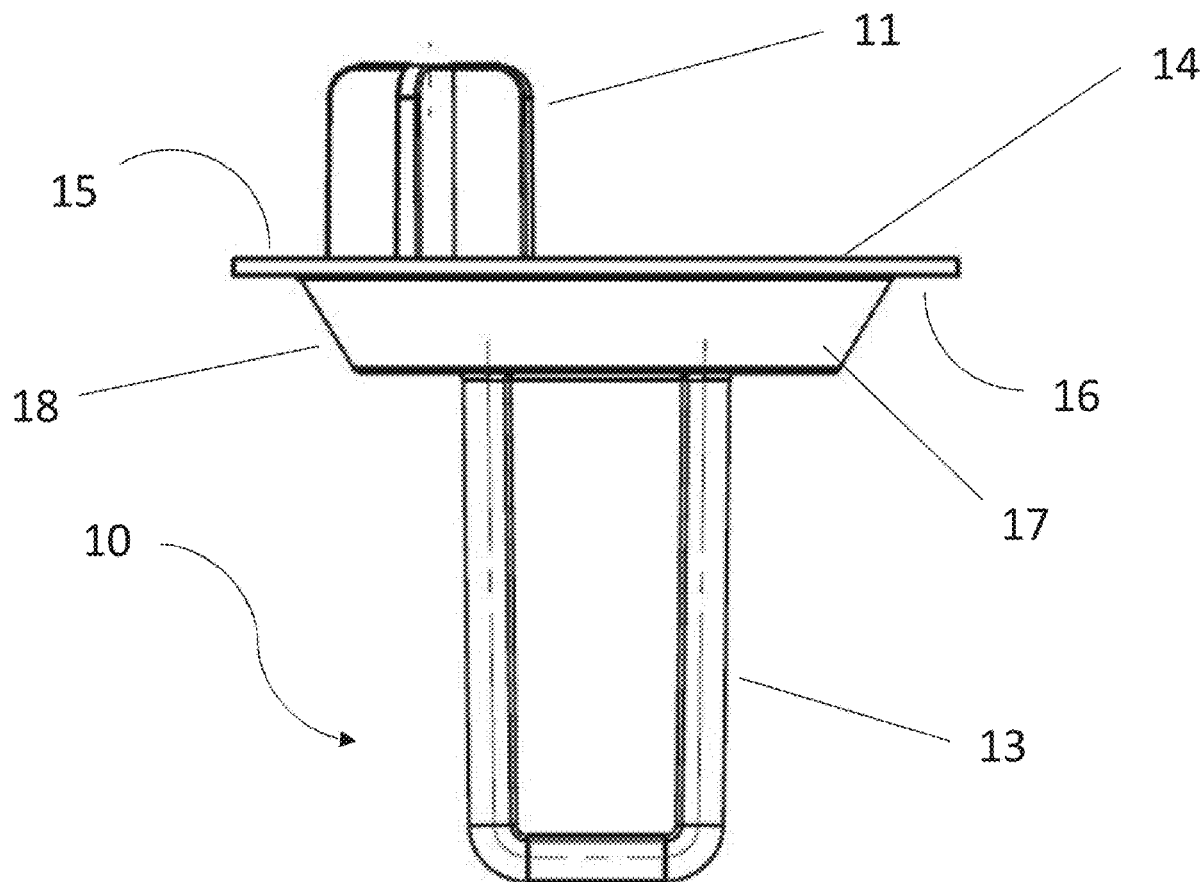
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(57) **ABSTRACT**

The current invention discloses a transit seal plug, the seal plug to be releasably secured to a dispensing cap. The sealing member includes first and second annular sealing faces, and further also includes a gripping member which extends away from a first side of the sealing member to engage walls of a conduit. A pull tab extends from the opposite side of the sealing member, to facilitate removal of the seal plug from a dispensing cap.



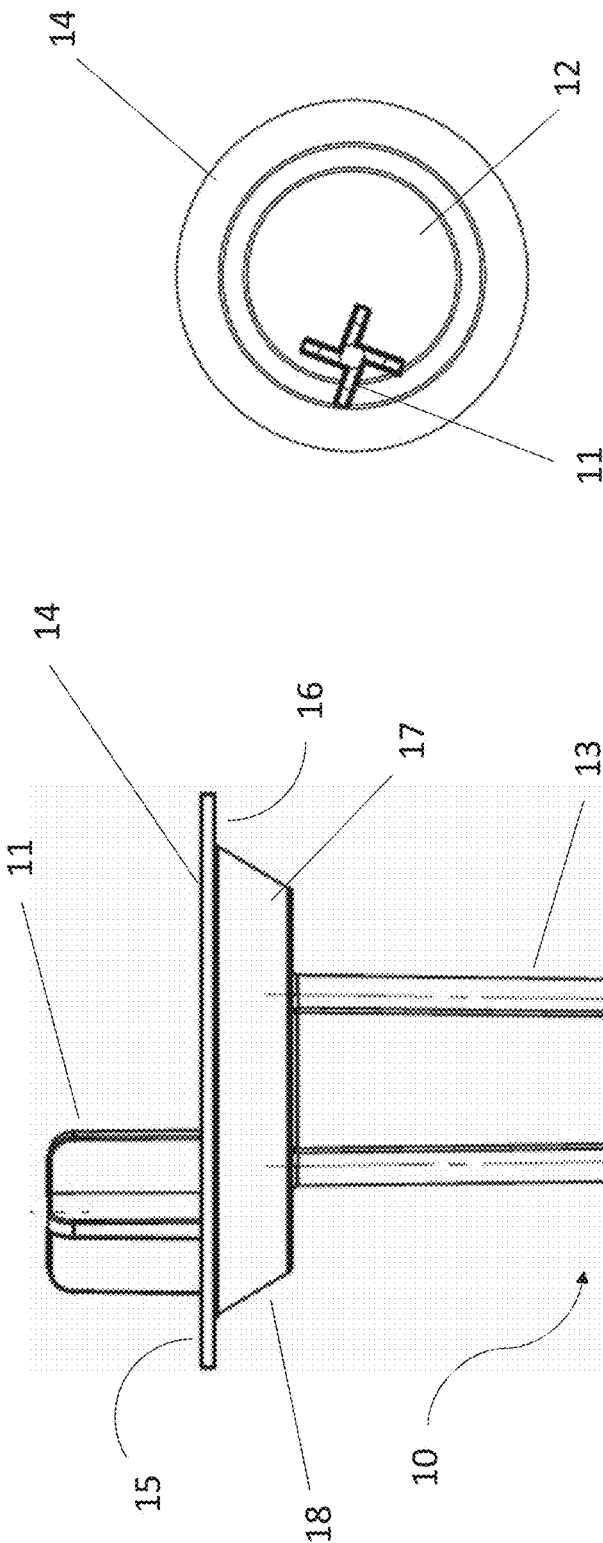


Figure 1

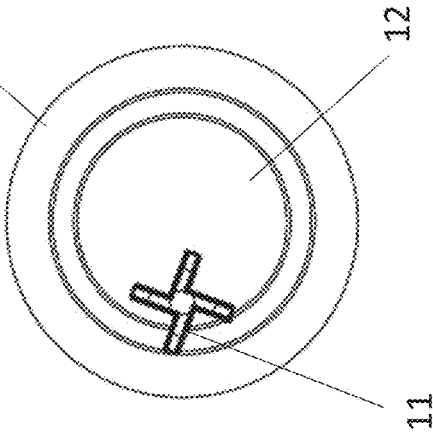


Figure 2

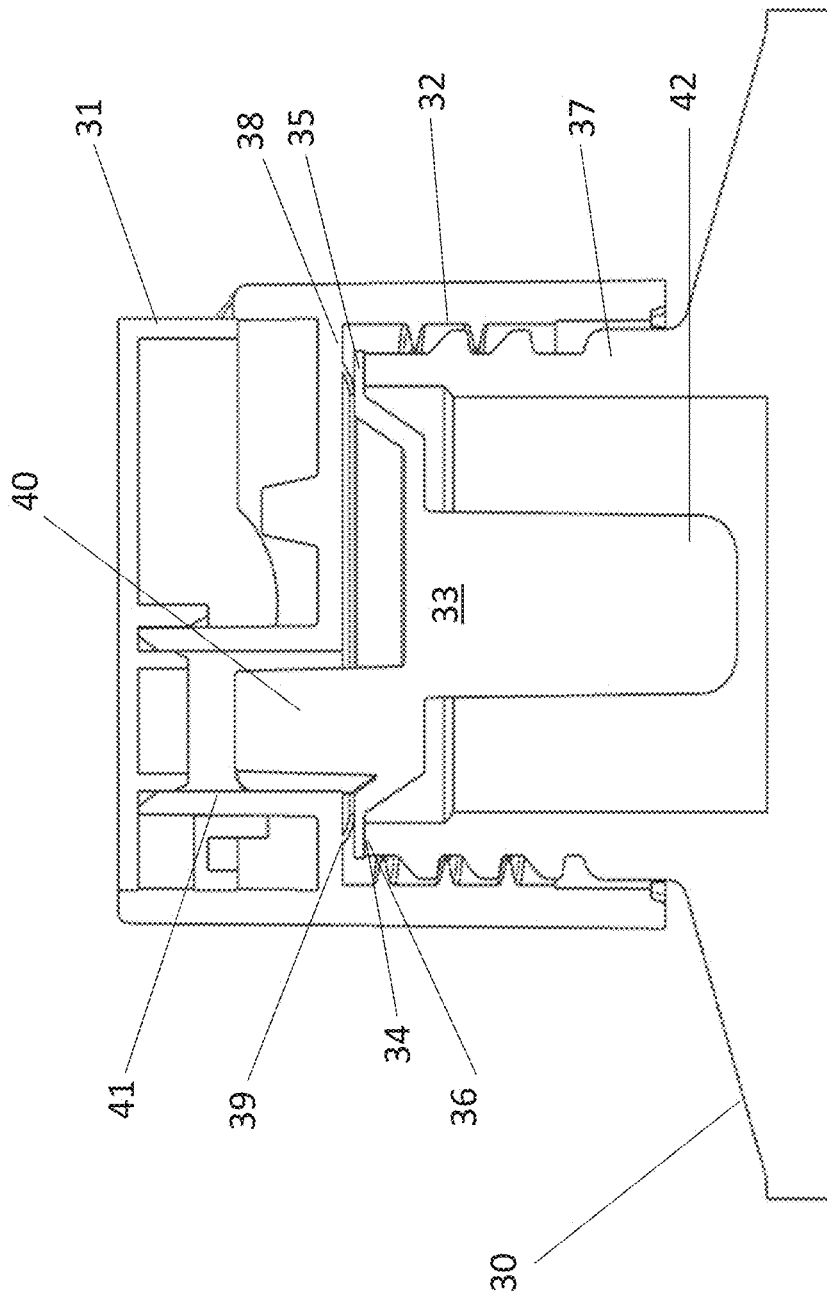


Figure 3

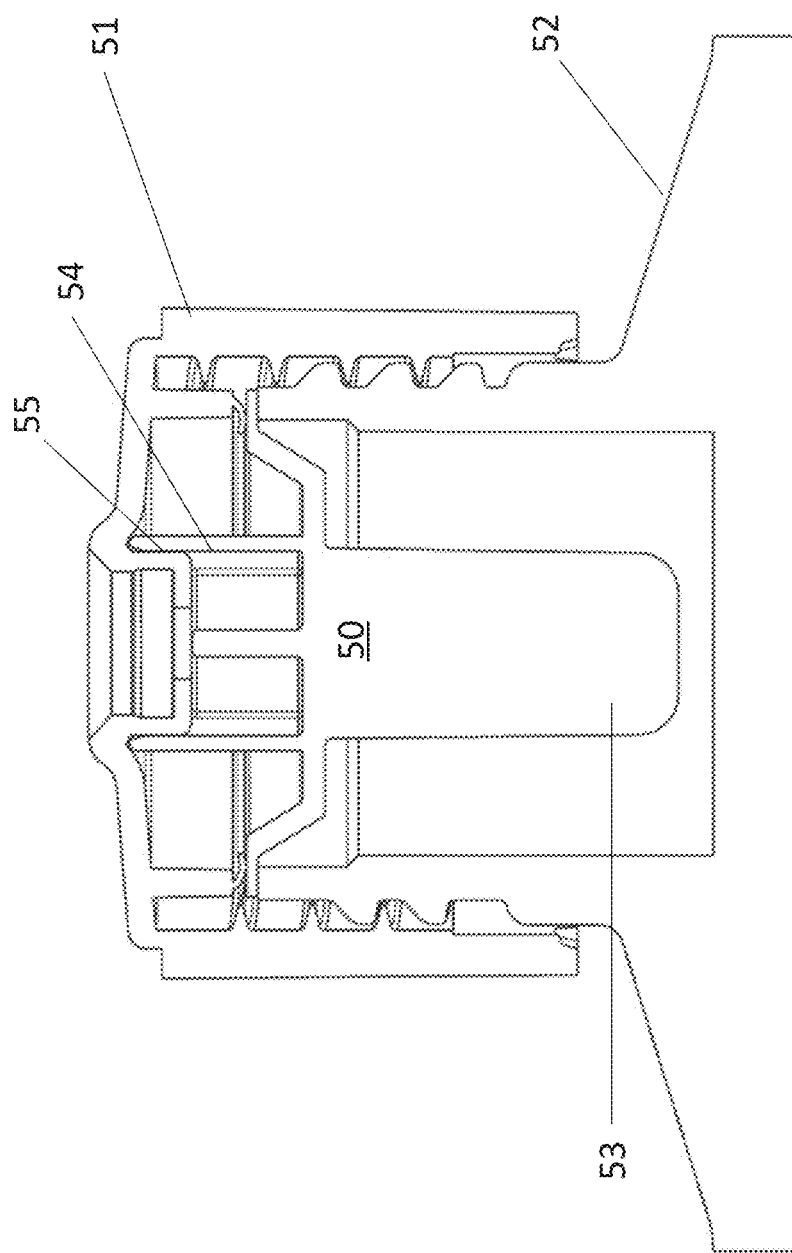


Figure 4

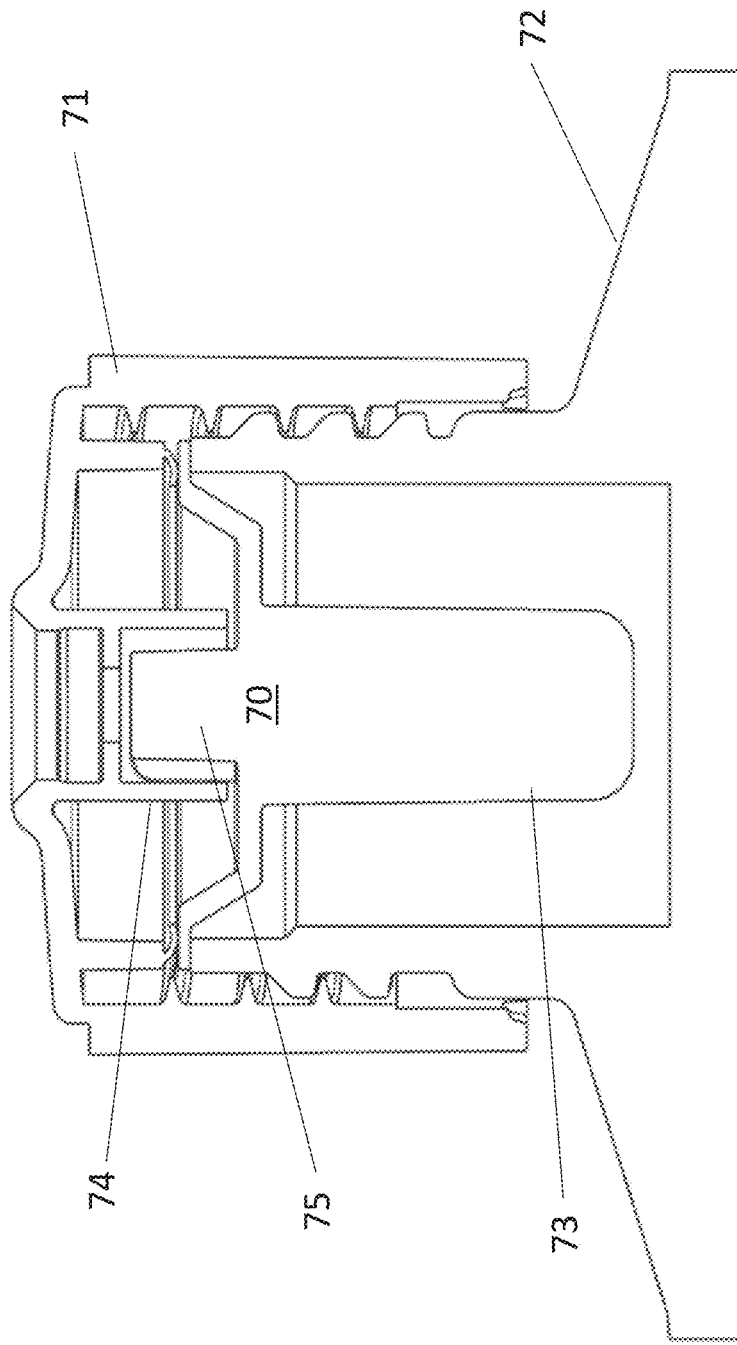


Figure 5

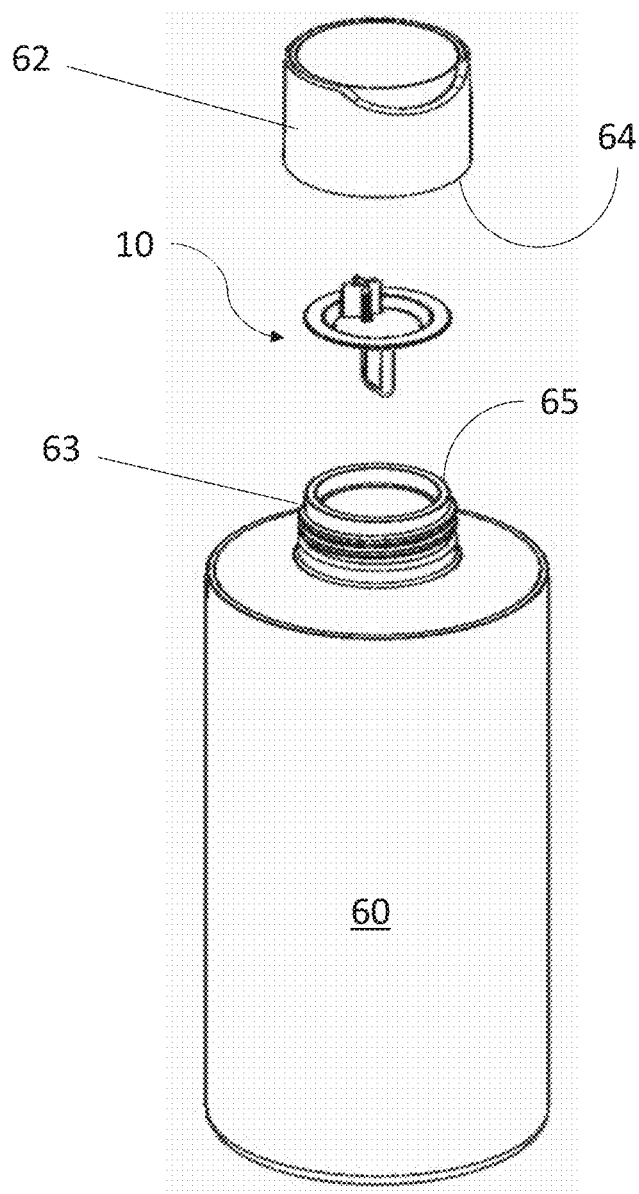


Figure 6

TRANSIT SEALING PLUG

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority to United Kingdom Patent Application No. 2015197.3, filed on Sep. 25, 2020, including the specification, claims, and drawings, the entire disclosures of which are incorporated by reference herein.

FIELD OF THE INVENTION

[0002] The present invention relates to a plug which prevents leakage of materials from a container during transit of the container. The type of container particularly contemplated is a plastic container having a disc-top or a flip-top dispensing cap, of the type commonly used to contain liquid products intended, for example, for household, personal, pet, automotive care.

BACKGROUND OF THE INVENTION

[0003] The use of plastic containers to transport fluids used in the consumer care sector is ubiquitous. Products such as personal cleaning, household, car-care etc. are typically supplied in a container body made from a plastics material. In order to dispense a small volume of the liquid, a dispensing cap is provided, which is fixed to the container and includes a fluid conduit in fluid contact at one end with the fluid within the container. When the second end of the conduit is open, the user can transfer the contents from the container to the desired area. In order to prevent unwanted spillage or evaporation of volatile components, a closure means is usually provided to releasably close the second end. Such a closure mechanism is usually also formed of a plastics material and must provide a sufficiently strong closure when required, yet allow the user to open the container with relative ease.

[0004] Two common types of closure mechanism are a disc-top cap and a flip-top cap. The former comprises a disc-like closure mechanism which is pivotable about an axis across a diameter of the cap. The pressure for pivoting can be applied by a user's thumb and brings the conduit of the cap between a first position where the conduit is in fluid connection with the container's contents allowing the contents to exit via the conduit, and a second position where there is no fluid connection and the container is thereby closed. Disc-top caps are often secured onto containers having a wider neck orifice than the conduit in the cap to aid in the dispensing of relatively viscous fluids.

[0005] A flip-cap closure comprises a cap, hinged mounted to the main cap body. The cap has a conduit which remains permanently in fluid connection with the fluid in the container body, allowing fluid to be dispensed out of the open end of the conduit. The hinge allows the closing portion on the cap to be moved from a first position in which the cap closes the conduit and a second position removed from the conduit which is thus open. A wide variety of hinge mechanisms are known.

[0006] A problem with which the current invention is concerned arises during transportation of a container to a customer. In recent times, and particularly during periods when people are required not to leave their houses because of a lockdown imposed to prevent the spread of a disease, on-line ordering of products has resulted in more goods

being delivered in individual packaging via postal delivery services. The risk when using such services of leakage of the container via the cap is greater, as handling of the individual containers can more easily result in the packaging being in a non-upright orientation than were the container to be bulk-delivered to a retail outlet.

[0007] It is an object of the present invention to provide a closure means and a container which is more resistant to loss of fluid than is a conventional container.

SUMMARY OF THE INVENTION

[0008] According to a first aspect of the invention there is provided a transit seal plug, the seal plug to be releasably secured to a dispensing cap; a sealing member having first and second annular sealing faces; a gripping member extending away from a first side of the sealing member to engage walls of a conduit; a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from a dispensing cap.

[0009] The invention allows a seal plug to be readily included as part of a fluid-filled container, and which seal plug can be reused to reseal a container if required.

[0010] Preferably, the centre of the sealing member is frusto-conical in shape, in a conformation extending away from the gripping member, forming a dish-like structure to enable the sealing portion to conform with the underside face, and so minimising the amount of plastic content necessary. This conformation also aids in guiding the seal plug into position relative to the container body. The gripping member is further preferably housed within the frusto-conical structure.

[0011] Optionally, the gripping member has a plurality of arms which reduces the weight of the seal plug. Further optionally, the gripping member is cylindrical in shape to provide greater engagement with a dispensing cap. Conveniently, the gripping member is hollow to reduce weight.

[0012] Preferably, the pull tab is rectangular in shape to provide a large surface area for a user to grip. Further preferably, the pull tab has a roughened surface to aid in a user gripping the pull tab. Yet further preferably, the pull tab has a profiled surface to assist a user in gripping the pull tab.

[0013] Preferably, the seal plug is formed of plastics material, the plastics material being selected from polypropylene (PP), polyethylene, such as optionally a low density polyethylene (LDPE), medium density polyethylene (MDPE), a polyethyleneterephthalate (PETE), a polyhydroxyalkanoate (PHA), polylactic acid (PLA). These materials can also be conveniently utilised as recycled grades.

[0014] According to a second aspect of the invention, there is provided a container comprising a container body, a dispensing cap having a dispensing conduit, secured thereto and interposed therebetween in sealing arrangement, a seal plug the seal plug comprising a sealing member having first and second annular sealing faces; a gripping member extending away from a first side of the sealing member to engage walls of the dispensing conduit; a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from the dispensing cap.

[0015] According to a third aspect of the invention, there is provided a dispensing cap/seal plug assembly, the assembly comprising a dispensing cap having a dispensing conduit, and a seal plug including a sealing member having first and second annular sealing faces; a gripping member extending away from a first side of the sealing member to

engage walls of the dispensing conduit; a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from the dispensing cap.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention is now described with reference to the accompanying drawings which show, by way of example only, three embodiments of a transit seal plug. In the drawings:

[0017] FIG. 1 is a side view of a first embodiment of transit seal plug;

[0018] FIG. 2 is top view of the transit plug of FIG. 1;

[0019] FIG. 3 is a cross-sectional view of a container closure including the first embodiment of transit seal plug;

[0020] FIG. 4 is a cross-sectional view of a container closure including a second embodiment of transit seal plug;

[0021] FIG. 5 is a cross-sectional view of a container closure including a third embodiment of transit seal plug; and

[0022] FIG. 6 shows three component parts of a container incorporating the first embodiment of transit seal plug.

DETAILED DESCRIPTION OF INVENTION

[0023] Prior art containers for fluids for many liquid products used in the household, personal hygiene or the like are typically formed of resilient plastics materials. They are further designed to have a dispensing means which can be readily opened and closed as required. As such they are susceptible to unwanted leakage of product. The risks of this can be minimised in the house and also when carried, for example in a sports bag by careful storage. Also, during bulk transportation which is usually well-controlled, the leakage of product is normally avoided.

[0024] However, where product is individually despatched to a user, via a postal courier service, then the risk of the container becoming orientated in the wrong position and/or being subject to a compressive force, tending to urge the liquid in the container to open the container, is increased. Spillages are not uncommon under such circumstances. The individual despatch of product is increasingly used, and has recently undergone a surge due to people subject to lockdown conditions, due to a pandemic, not physically purchasing goods at a store but instead purchasing on-line. Means of preventing this leakage happening are known in the art. For example, milk containers and sauce bottles usually include a plastic or foil disc across the neck of the bottle which is removed before use by the consumer. Such foils however are single-use, and need to be disposed of following removal. Moreover, the foils are bonded to the container neck to achieve the necessary seal. This requires specialist equipment which needs to be purchased and maintained, and needs also to be incorporated into the filling company's production line. This adds to the costs and also decreases the output speed of the production line.

[0025] Also, plastic bottles often have a removable tab on the outside of the closure mechanism which tab is removed prior to the first use.

[0026] The approach disclosed herein seeks a more sturdy solution which is also compatible with conventional closure designs, so avoiding the requirement to invest in expensive new tooling. Moreover, the invention described is reusable, and can be supplied ready fitted so not reducing the speed of the filling step or increasing the cost thereof.

[0027] In its broadest aspect the invention provides a removable insert which in use is located between the neck of a container body and an outlet provided by an attached cap. The insert provided engages with the cap and is provided to a filling company already incorporated therein, and suitable simply to be attached to the filled container body. The first time a user wishes to use the product in the container, the dispensing cap is removed from the container body and the insert separated therefrom. The cap is replaced onto the container body and the insert disposed of, or alternatively stored for later replacement into the dispensing cap if desired.

[0028] Referring initially to FIGS. 1 and 2 these illustrate an insert in accordance with the current invention. The various elements of the transit plug, generally referenced 10, can be formed of a plastics material such as polypropylene (PP), polyethylene, such as optionally a low density polyethylene (LDPE), medium density polyethylene (MDPE), a polyethyleneterephthalate (PETE), a polyhydroxyalkanoate (PHA), polylactic acid (PLA). These materials can also be conveniently utilised as recycled grades.

[0029] The transit seal plug 10, referred to herein as a transit plug, has 3 main elements. The first is a spigot 11, housed within a frusto-conical recess in, and extending from a main dish-shaped, sealing portion 12. Although the sealing portion can also be planar across its width, the dish shape is preferable in order to allow the sealing portion 12 to conform with the underside face, in doing so minimising the amount of plastic content necessary. The spigot 11, in use, forms an interference fit with the dispensing conduit located within the cap 62 (see FIG. 6) and acts to resist separation of the transit plug 10 and the dispensing cap 62 when such is not desired. The spigot 11 has a 4 arms in a cross-shaped or plus sign cross-section, which enables sufficient frictional engagement with the conduit, but reduces the mass of the spigot and the materials required for its production. Other shapes of spigot can also be utilised such as spigots having other than 4 arms, or arranged in another conformation, cylindrical, or other polyhedra. The spigot can also be either solid or hollow depending on the strength or weight/materials requirement.

[0030] Extending from the opposite side of the sealing portion 12 is a pull tab 13 which a user grips hold of to remove the transit plug 10 from the dispensing cap 62. The pull tab 13 is generally rectangular in the illustrated embodiment, extension in the third dimension being generally far less than in the other two, and can have a roughened surface and/or include surface features to aid a user in gripping the pull tab 13. Pull tabs having different shapes from rectangular can be utilised if desired.

[0031] The sealing portion 12 itself in use seats between the cap 62 and the container body 60 to form a seal therebetween preventing fluid from reaching the conduit in the dispensing cap 62. In the illustrated embodiment, the transit plug has a flange 14, having an upper flange face 15 from which the spigot 11 extends. The upper flange face 15 is generally planar enabling engagement with the dispensing cap 62. The lower flange face 16 also has a planar outer annular portion to engage the upper rim 65 of the neck 63 of the container body 60. Extending downwardly from the lower flange face 16 is a frusto-conical locator 17. The taper of the wall 18 of the locator 17 assists in the transit plug 10 passing without frictional engagement, into engagement with the container body 60. Frictional engagement would

possibly cause plastic dust to be produced, which should be avoided due to contamination of the product and ultimately of the environment.

[0032] In use therefore, a transit plug **10** is secured into a dispensing cap **62** by insertion of the spigot **11** into the dispensing conduit within the dispensing cap **62**. The frictional engagement between the spigot **11** and the wall of the conduit maintains the dispensing cap **62** and the spigot **11** in coupled separable relationship. The engagement between the spigot **11** and the wall of the conduit also acts to orientate the transit plug correctly. The upper flange face **15** is pressed against the lower edge **64** of the dispensing cap **62** to form a seal.

[0033] A container body **60** is filled with a liquid product and the cap/flange assembly secured thereto, optionally by means of a screw-threaded arrangement. In doing so, the lower flange face **16** is urged against the rim **65** of the container body **60** forming a seal. The seal between the transit plug **10** and the dispensing cap **62** can also be strengthened at the same time due to the force generated by engagement. The fluid is thus more securely sealed within the container and the seals formed between the transit plug **10** and the container body **60** and dispensing cap **62** prevent leakage of the fluid from the container.

[0034] Turning to FIG. 3, this illustrates an assembly including the first embodiment of transit plug shown in FIGS. 1 and 2. The assembly comprises a container body **30** with a disc-top dispensing cap **31** secured by a threaded connection **32** thereto. In order to provide a transit seal therebetween a transit plug **33** is included which can be removed by a user on first use of the product. The lower flange face **34** of the flange **35** of the transit plug **33**, sealingly engages the rim **36** of the neck **37** of the container body **30**. The upper flange face **38** is sealingly engaged with the circumferentially deployed flexible leaf seal **39**. In order to hold the dispensing cap **31** and the transit plug **33** together, the cross-shaped spigot **40** engages the dispensing conduit **41** of the dispensing cap **31**. A pull tab **42** is provided to enable a user to separate the transit plug **33** from the dispensing cap **31**.

[0035] FIG. 4 illustrates a second embodiment of transit plug **50** for use with a flip-top dispensing cap **51**. In this embodiment, engagement of the transit plug **50** with the container body **52** through the flange faces is as described above for the embodiment of FIG. 3, as is the pull tab **53**. In this embodiment the transit plug **50** has an upstanding tubular feature **54**. This tubular feature **54** defines a cylindrical space, and makes frictional contact on its inside diameter wall with the outside diameter wall of the dispensing cap orifice detail **55**. Frictional contact ensures that the transit plug **50** is retained to the cap.

[0036] In FIG. 5, a third embodiment of transit plug **70** for use with a flip-top dispensing cap **71**. In this embodiment, engagement of the transit plug **70** with the container body **72** through the flange faces is as described above for the embodiment of FIG. 3, as is the pull tab **73**. The dispensing cap **71** includes a tubular section beneath the dispensing conduit detail **74**. The transit plug has an upstanding spigot feature **75**. The spigot feature **75** forms an interference fit with the dispensing cap tubular section **74** on the inside diameter face. The spigot feature **75** has a cross-shaped or plus sign cross-section, which enables sufficient frictional

engagement with the tubular section of the cap **71**, but reduces the mass of the spigot **75** and the materials required for its production. Other shapes of spigot can also be utilised such as solid or hollow cylindrical, or other polyhedra.

What is claimed is:

1. A transit seal plug, the seal plug to be releasably secured to a dispensing cap;
 - a sealing member having first and second annular sealing faces;
 - a gripping member extending away from a first side of the sealing member to engage walls of a conduit;
 - a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from a dispensing cap.
2. A transit seal plug according to claim 1, wherein the centre of the sealing member is frusto-conical in shape, in a conformation extending away from the gripping member, forming a dish-like structure to enable the sealing portion to conform with the underside face.
3. A transit seal plug according to claim 2, wherein the gripping member is housed within the frusto-conical structure.
4. A transit seal plug according to claim 1, wherein the gripping member has a plurality of arms.
5. A transit seal plug according to claim 4, wherein the gripping member is cylindrical in shape.
6. A transit seal plug according to claim 5, wherein the gripping member is hollow to reduce weight.
7. A transit seal plug according to claim 1, wherein the pull tab is rectangular in shape.
8. A transit seal plug according to claim 7, wherein the pull tab has a roughened surface.
9. A transit seal plug according to claim 8, wherein the pull tab has a profiled surface.
10. A transit seal plug according to claim 1, wherein the seal plug is formed of plastics material.
11. A transit seal plug according to claim 10, wherein the plastics material is selected from polypropylene (PP), polyethylene, a low density polyethylene (LDPE), medium density polyethylene (MDPE), a polyethyleneterephthalate (PETE), a polyhydroxyalkanoate (PHA), polylactic acid (PLA).
12. A transit seal plug according to claim 10, wherein the plastics material is a recycled grade.
13. A container comprising a container body, a dispensing cap having a dispensing conduit, and secured thereto and interposed therebetween in sealing arrangement, a seal plug the seal plug comprising a sealing member having first and second annular faces; a gripping member extending away from a first side of the sealing member to engage walls of the dispensing conduit a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from the dispensing cap.
14. A dispensing cap/seal plug assembly, the assembly comprising a dispensing cap having a dispensing conduit, and a seal plug including a sealing member having first and second annular sealing faces; a gripping member extending away from a first side of the sealing member to engage walls of the dispensing conduit, a pull tab extending from the opposite side of the sealing member, to facilitate removal of the seal plug from the dispensing cap.

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