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(54) Tamper-evident cap for a keg spear.

(57) A cap for a keg spear has internal teeth (13), which snap-engage over an annular projection on the spear. A tamper-evident ring (40) is provided on the cap skirt (12) and connected to the skirt by radial tags (41) having point attachment to the skirt. The ring obstructs access to the skirt for levering off the cap, so that any such attempt loosens the ring by breaking the tags to provide tamper evidence. The ring (40) is securely fixed to a tab (30,31) defined by a pair of lines of weakness extending axially in the skirt (12) and radially across the top (11) of the cap. The ring can be used as a handle to split the cap for removal in one piece.

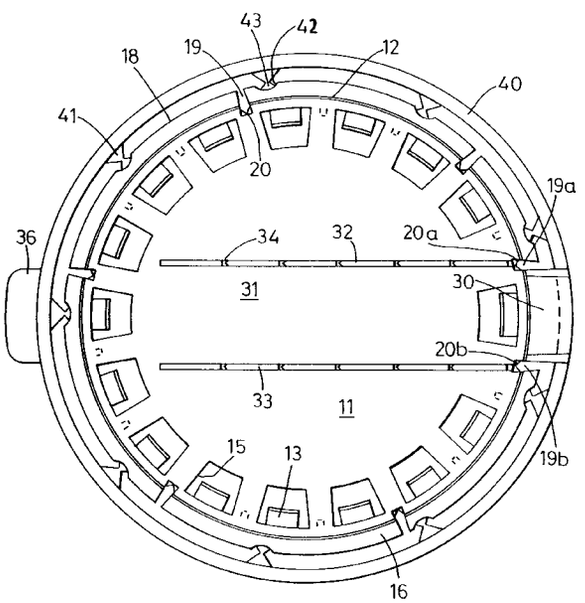

Fig. 3

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This invention relates to a tamperproof cap for a keg spear, as provided on beer kegs.

A keg spear is screw-engaged in a keg and has an external access portion comprising a peripheral wall defining a recess, an access device being provided in the recess.

The peripheral wall is provided with an outwardly extending annular projection and a tamper-evident cap has a ring of teeth, which can be snap-engaged over the annular projection to cover the recess and prevent the keg contents being accessed without removal of the cap.

The keg spears are generally made with the peripheral walls of the same diameter, within tolerances. The annular projections are made of different profiles by different manufacturers and the different profiles have, for example, varying axial depths. This makes it difficult to produce a cap, which is satisfactory with all keg spears.

The cap has to be sufficiently resilient to snap over the annular projections of different profiles, but must be brittle enough for the cap to break, if an attempt is made to remove the cap. This has proven to be difficult to achieve in practice.

Use of brittle materials means that different caps have to be made for different profiles and/or there are numerous failures when the caps are applied, whereas use of less brittle materials enables the cap to be removable without damage. This is sometimes achieved by gently warming the cap, if it is thermoplastic, so that it becomes easier to remove.

One tamper-evident cap relies on brittleness of the material, so that the teeth, snap-engaged over the annular projection, break when an attempt is made to remove the cap. This is unsatisfactory for several reasons.

The cap is not usable with all keg spears, because of poor tolerances. The brittleness of the material means that tolerances have to be small.

The breaking of some of the teeth is not an immediately clear indication that a cap has been tampered with.

It is necessary to break the teeth to open a keg, so that there are always tooth remnants produced.

GB-A-2082151 proposed an arrangement in which the skirt of the cap, provided with the teeth, had a tapering portion below the teeth, which would break when an attempt was made to remove the cap. It has, however, proved difficult to make a cap, which is effective, because of the conflicting requirements of resilience, for snap-engagement on keg spears of different profiles, and brittleness to provide tamper-evidence, in particular, because of the possibility of increasing the flexibility by warming. GB-A-2082151 used a brittle material, such as polystyrene or a.b.s.

The present invention seeks to overcome these prior art problems.

The present invention provides a tamper-evident cap for a keg spear, the cap comprising a top and a skirt provided with a ring of internally projecting means snap-engageable over an annular flange on the keg spear to resist removal of the cap, a tamper-evident ring of larger diameter than the skirt being attached to the skirt adjacent its free end remote from the top, the ring extending axially away from the top and being attached to the skirt by several frangible tags spaced around the ring and extending radially between the skirt and the ring; characterised in that each tag reduces in width away from the ring and the skirt and has substantially point-to-point attachment to the other of the ring and skirt.

This arrangement provides a ring which obstructs access to the skirt for levering off the cap. The ring itself is easily caused to detach from the rest of the cap at the frangible tags and breaking of tags causes the ring to be loose, so that there is an immediate indication that the cap has been tampered with.

The tags point-to-point attachment to circumferentially spaced projections on the skirt, prevents a detached ring from being wedged in its correct position to conceal tampering.

The cap can be readily fitted to a keg spear by an automatic system by applying pressure to the top of the cap. The ring does not contact the keg spear during fitting and the conflicting requirements of brittleness and resilience for the cap are removed.

Fitting of the cap does not cause fracture of the tags. During fitting of the cap, there is radial distortion of the skirt, which could cause fracture of axial tags. The radial tags of this invention are under radial compression, which they can withstand, whereas a small, axial shear force can break the tags.

A tool cannot be used on the cap, to unscrew the keg spear, since the tool will cause breakage of the tags by bearing on the ring, which is of greater diameter than the skirt.

The cap is preferably made of high density polyethylene, or polypropylene, which provides sufficient resilience for fitting different keg spear profiles, but which make it very difficult to re-adhere the tamper-evident ring in its correct position, without causing obvious damage as evidence of tampering.

US 4,699,285 (equivalent to EP 0,189,345) discloses a closure device for a threaded bottle top comprising a cap with a skirt having internal screw threads, an insert, and a tamper-evident band attached to the skirt. The band may comprise bridges (36), each of which reduces in width away from the band until the point of attachment with the skirt. Such a device does not solve the problem of indicating tampering effectively because, once broken by unscrewing, the bridges could be screwed back into position to conceal tampering.

GB-2265892 discloses a cap of superficial resemblance to a keg spear cap. This cap, however, has

a skirt with a screw-thread, and a tamper-evident ring is provided to prevent unscrewing of the cap, without damage to the tamper-evident ring. The ring can be removed to allow the rest of the cap to be used, removed and re-applied by means of the screw-thread.

The purpose of the tamper-evident ring is quite different from that of the present invention. The concept of providing a ring which has formations to prevent rotation, so as to provide tamper-evidence of unscrewing of the cap has no bearing on the tamper-evidence problem in relation to a keg spear.

With a keg spear, the cap is non-removably fixed on the keg spear, removal only being possible by destruction of the cap. The cap is rotatable on the keg-spear. The problem to be met is not to provide tamper evidence of rotation, but to provide tamper evidence of levering off of the cap.

The prior art has approached this problem by providing a brittle cap. Either the teeth, which secure the cap to the keg spear have been made brittle, or the cap skirt has been provided with a brittle flange.

US 4,712,705 discloses a tamper-evident cap for a beverage tank disperser valve in which the cap has a lower skirt portion attached to the body by a plurality of spaced frangible connecting elements and an integral tear strip. A problem with such caps is that tampering can be concealed if a detached tear strip is wedged in its correct position.

The prior art has not considered the possibility of providing a ring, which obstructs access to the cap and is easily, substantially detached from the cap as a sign of tamper evidence, but cannot readily be wedged in position to conceal tampering.

The skirt preferably has an axial weakened portion at a circumferential location to permit splitting of the skirt to facilitate removal of the cap from a keg spear. Such an arrangement is disclosed in GB-2082151 and US-A-4779750.

The ring is also, preferably, securely fixed to the skirt adjacent the circumferential location, so that the ring can be detached from the skirt, except at said location, by breaking of the tags and used as a handle to split the skirt at the weakened portion.

In a further aspect the invention provides a tamper-evident cap for a keg-spear, the cap comprising a top and a skirt provided with a ring of internally projecting means snap-engageable over an annular flange on the keg spear to resist removal of the cap, a tamper-evident ring of larger diameter than the skirt being attached to the skirt adjacent its free end remote from the top, the ring extending axially away from the top and being attached to the skirt by several frangible tags spaced around the ring and extending radially between the skirt and the ring; characterised in that the skirt has an axial weakened portion at a circumferential location and the ring is securely fixed to the skirt adjacent said location, whereby the ring can be detached from the skirt, except at said location, by breaking the tags, and used as a handle to split the skirt at a weakened portion.

The above feature facilitates very simple removal of the cap in one-piece in a single action, thereby overcoming the problems associated with the production of separate cap remnants such as tooth fragments experienced with known caps for keg spears.

The prior art has not considered the possibility of providing a ring which can be detached and used as a handle to facilitate easy removal of the cap in one-piece.

Reference is now made to the accompanying drawings, wherein:-

Fig. 1 is a side elevation of a cap according to the invention,

Fig.2 is a sectional side elevation of the cap of Fig. 1, and

Fig.3 is a plan view of the cap of Fig.1.

The cap shown comprises a top 11, a skirt 12, and an internal ring of circumferentially spaced teeth 13 projecting inwardly from the skirt between the top and the free end 14 of the skirt. The top 11 of the cap has apertures 15 aligned with respective teeth to permit injection moulding of the teeth.

UK patent application no. 2082151 discloses a similar arrangement to that so far described. The ring of teeth 13 is snap-engageable over an annular, outwardly extending flange on a keg spear, to secure the cap on the spear, in known manner as described in the above published application.

The skirt 12 of this embodiment of the invention, however, has a radially, outwardly extending flange 16 at the free end, the flange being of generally triangular section with an inclined surface 17 leading to a narrow, circumferential edge 18.

The skirt also has optional, axial slots 19 spaced around the skirt, with thin portions 20 bridging the slots. These assist removal of the cap.

A tamper-evident ring 40 is provided, which is of greater diameter than the skirt 12. The ring 40 is attached to and surrounds the circumferential edge 18 of the skirt and extends axially beyond the free end 14 of the skirt. In practice, the axial length of this extension is determined to make it difficult to insert fingers, or a levering tool under the free end of the skirt without contacting the skirt.

The ring 40 is attached to the skirt by tags 41 on the inside of the ring. These tags are generally of triangular form and are tapered substantially to a point. The edge 18 of the skirt 12 has recesses 42, each provided with a triangular tag 43. These tags on the skirt have substantially point-to-point attachment to the tags 41 on the ring 40. All of the tags extend radially between the ring and the skirt.

The ring and tags are injection moulded with the rest of the cap in one piece. High density polyethylene is preferred, or polypropylene may be used.

The ring 40 is securely fixed to the skirt 12 by a

bridge 30 at one circumferential position. This bridge is bounded at opposite sides by axial lines of weakness in the skirt. These lines of weakness are defined by a pair of the axial slots 19a, 19b with bridging portions 20a,20b.

A radial tab 31 is also defined in the top 11 between a pair of elongate lines of weakness 32,33, which join the respective slots 19a,19b in the skirt 12. The lines of weakness are defined by slots with thin, frangible portions 34 joining the tab 31 to the rest of the top 12. The bridge 30 is joined to the tab 31.

A manually grippable portion 36 extends radially outwardly of the ring 40 diametrically opposite to the location of the bridge 30. This can be omitted, if required, but serves primarily to indicate the point at which the cap should be gripped to effect removal from a keg spear.

In use, the cap is secured to a keg spear by application of a force to the top 11 of the cap, so that the teeth and the skirt deform resiliently and snap over the annular projection of the keg spear in known manner. No force is directly applied to the ring 40. Deformation of the skirt puts the tags 41,43 in radial compression without breaking the connection between the tags.

Any attempt to remove the cap with fingers or a levering tool will result in a force being applied to the tamper-evident ring 40. The connection between the tags 41,43 break readily when the tags are put under low shear forces, so that the ring is loosened from the skirt.

This provides an immediately apparent indication that the cap has been tampered with.

The provision of point-to-point attachment of the tags 41,43 makes it very difficult for the ring to be wedged back into its original position.

The cap is easily removed by grasping the ring 40 at the grippable portion 36 and pulling ring. This breaks the frangible connection at the tags 41,43 and the ring then serves as a handle to put force on the bridge 30. Continued pulling on the ring causes the bridge 30 and longitudinal edges of the tab 31 to separate from the remainder of the cap, with breaking of the bridging portion 20a,20b and frangible portions 34. This splits the cap, while the cap remains in one piece, to facilitate removal of the cap.

A label (not shown) may be adhered to the top 11. The label may serve as a dust cover by covering the moulding apertures and other gaps in the top. The label is rippable by the separation of the longitudinal edges of the tab 31, when the cap is removed from a keg spear.

The edge of the ring 40, remote from the skirt, may have an uneven surface, e.g. may be castellated, to make it difficult to run a finger, or levering tool circumferentially around the keg spear in an attempt to remove the cap.

Claims

1. A tamper-evident cap for a keg spear, the cap comprising a top (11) and a skirt (12) provided with a ring of internally projecting means (13) snap-engageable over an annular flange on the keg spear to resist removal of the cap, a tamper-evident ring (40) of larger diameter than the skirt (12), being attached to the skirt adjacent its free end remote from the top (11), the ring (40) extending axially away from the top (11) and being attached to the skirt (12) by several frangible tags (41) spaced around the ring and extending radially between the skirt and the ring; characterised in that each tag (41) reduces in width away from the ring (40) and the skirt (12) and has substantially point-to-point attachment to the other of the ring and the skirt.

2. A tamper-evident cap for a keg spear, the cap comprising a top (11) and a skirt (12) provided with a ring of internally projecting means (13) snap-engageable over an annular flange on the keg spear to resist removal of the cap, a tamper-evident ring (40) of larger diameter than the skirt (12), being attached to the skirt adjacent its free end remote from the top (11), the ring (40) extending axially away from the top (11) and being attached to the skirt (12) by several frangible tags (41) spaced around the ring and extending radially between the skirt and the ring; characterised in that the skirt (12) has an axial weakened portion (19a,19b) at a circumferential location (30) and the ring is securely fixed to the skirt adjacent said circumferential location, whereby the ring can be detached from the skirt, except at said location, by breaking of the tags (41) and used as a handle to split the skirt at a weakened portion.

3. A tamper-evident cap according to Claim 1, wherein the skirt has an axial weakened portion (19a,19b) at a circumferential location (30) to permit splitting of the skirt (12) to facilitate removal of the cap from a keg spear.

4. A tamper-evident cap according to Claim 3, wherein the ring (40) is securely fixed to the skirt (12) adjacent said circumferential location (30), whereby the ring can be detached from the skirt, except at said location, by breaking of the tags (41) and used as a handle to split the skirt at the weakened portion.

5. A tamper-evident cap according to any of Claims 2 to 4, wherein said weakened portion comprises a pair of lines of weakness (19a,19b), circumferentially spaced on the skirt (12), with the ring being securely fixed to the skirt portion between the

lines of weakness.

6. A tamper-evident cap according to Claim 5 wherein the top (11) has a tab (31) defined by a pair of lines of weakness (32,33) associated with the lines of weakness (19a,19b) in the skirt (12), so that during removal of the cap from a keg spear, the tab (31) is partially detached from the top to facilitate removal of the cap.

7. A tamper-evident cap according to any preceding claim made as a one-piece plastics moulding from polyethylene, or polypropylene.

8. A tamper-evident cap according to any preceding claim, including a label secured to the top of the cap and serving as a dust cover.

9. A keg spear having attached thereto a cap according to any preceding claim, the keg spear having an annular flange and the projecting means (13) being snap-engaged over the flange so that the cap is rotatably secured on the keg spear with the ring blocking access to the interior of the skirt.

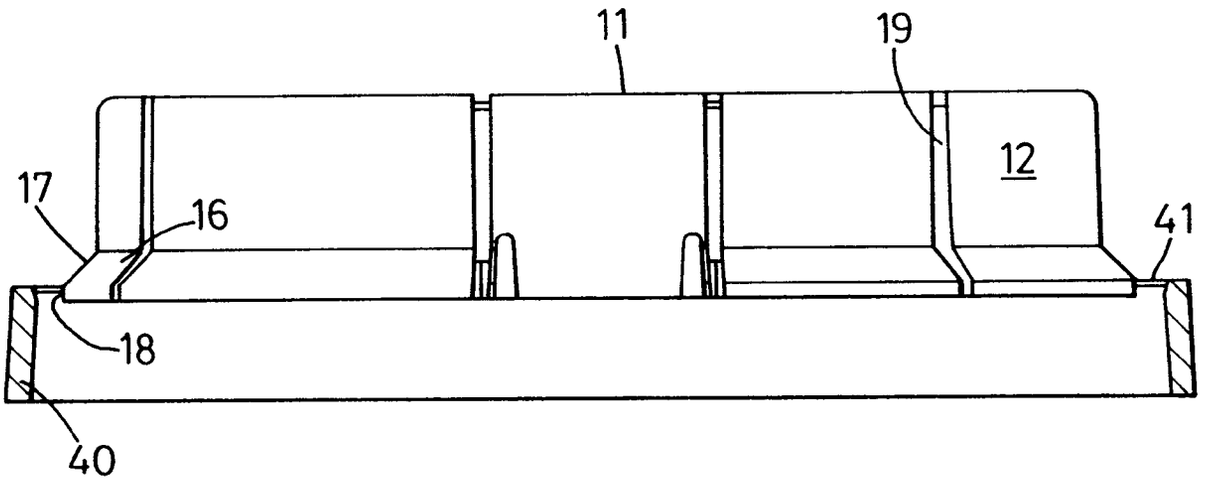

Fig. 1

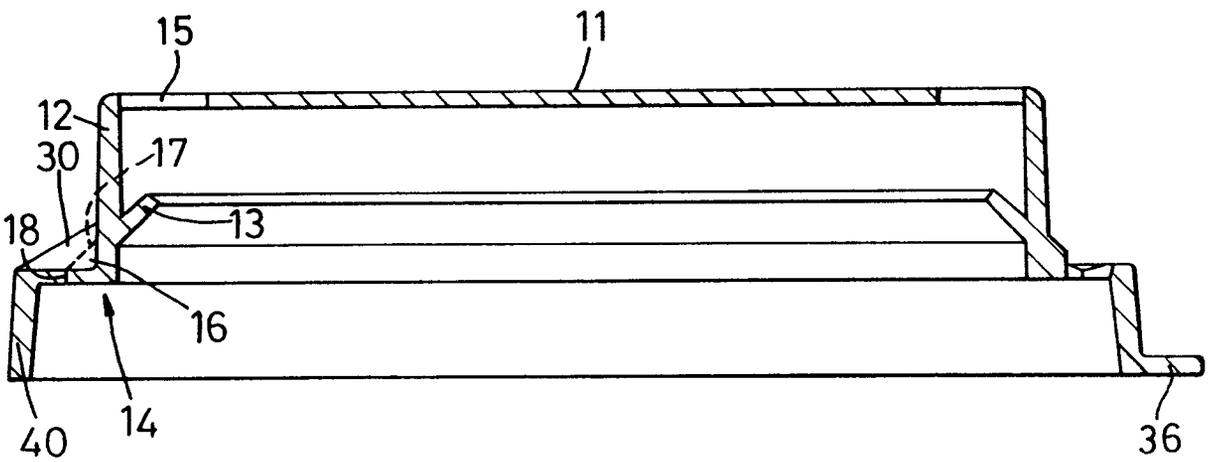

Fig. 2

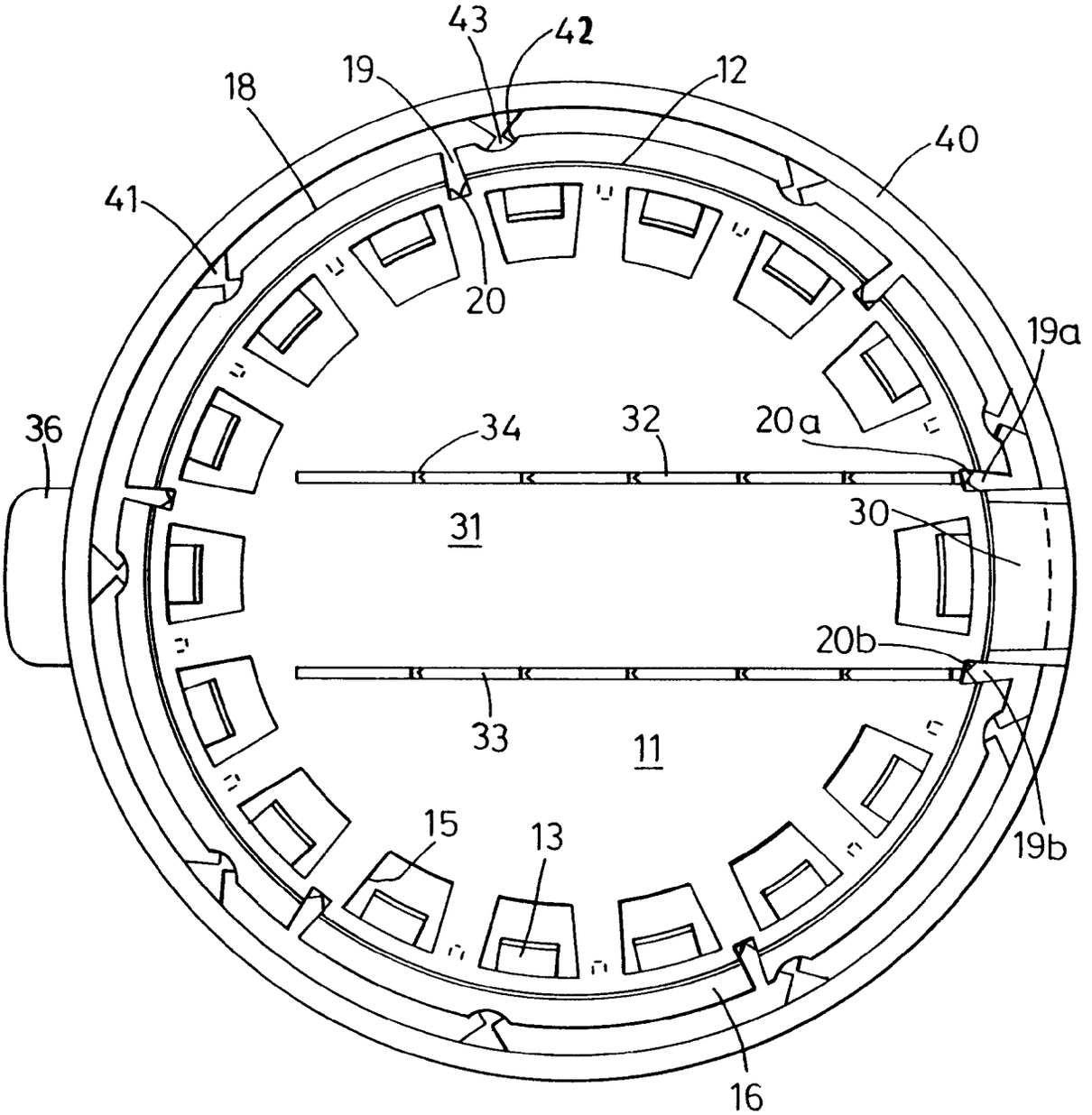

Fig. 3