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(54) Tamper-evident cap for a barrel

(57) A tamper-evident cap for protecting a valve in a keg beer barrel, the barrel having a circular flange 4 associated with the valve, includes a cover plate 1 and a cylindrical skirt 2 extending from the cover plate. Retention elements 3 attached to the skirt engage under the circular flange 4 to hold the cap in place. At least

one hinge 8 is included in the cover plate and bending of the cover plate at the hinge or hinges allows the retention elements to disengage from under the circular flange without damage to the retention elements. Bending of the hinge cannot occur without discernible damage to the cap.

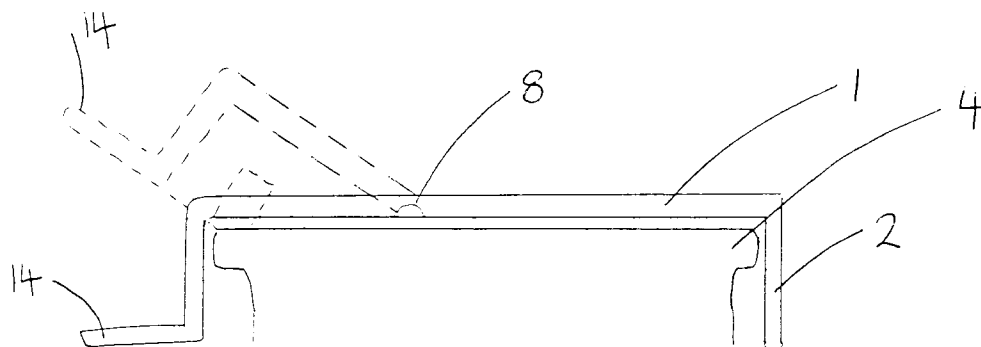


FIG 5

EP 0 761 556 A1

Description

BACKGROUND OF THE INVENTION:

Inventive Field

The invention relates to a tamper-evident protective cap for a valve in a keg barrel.

Prior Art

Keg barrels are metal barrels for holding beer and the like. The kegs are provided at the base with a valve which can be connected to a pipe for dispensing the beer which is usually forced out of the keg and through the pipe by internal carbon dioxide pressure.

The valve projects a small distance beyond the base of the barrel and is surrounded and protected by a circular flange provided on the keg.

As an additional protection for the valve while travelling, it is usual to provide a cap which covers the valve and is held in place by retention means which lock under the circular flange. As keg beer is often supplied on a sale or return basis, it is desirable that the above caps be tamper-evident, ie that it should be possible to tell easily when a cap has been removed and replaced. However it is also desirable that such a cap should not disintegrate when removed, since the cap can be re-fitted on to empty kegs for return to the brewery in order to protect the valve until the keg is cleaned and refilled. This also allows for recycling of the whole caps or at least of the material from which they are made.

US 4607759 discloses a sealing cap for a keg barrel which has a circular flange to protect its valve. The cap is made of plastics material and includes a cover plate, a cylindrical guideway projecting from the cover plate and a plurality of locking elements on the guideway biased inwardly to engage under the circular flange. The locking elements are arranged such that the sealing cap cannot be removed from the barrel without at least some of the locking elements being damaged or torn from the rest of the cap. The locking elements may break off individually from the cap or a part of the cap including several locking elements may break off along rupture lines. The state of the locking elements therefore shows whether or not the barrel has been tampered with.

The above caps have been found to suffer from some disadvantages. In removing the cap there is always some breakage; individual locking elements may break away from the rest of the cap or larger portions of the cap containing several locking elements may snap off. When the cap is removed, the parts of the cap which break off tend to flick away from the rest of the cap and may become lost or cause mess. The locking elements may even enter the valve and cause spraying of beer or stop the flow.

Furthermore, because parts break off the cap, it is often not re-fitted on the valve when an empty barrel is

returned. This makes the valve more likely to suffer damage and prevents recycling of the plastics material from which the cap is made. Even if the cap is re-fitted for return of the barrel, it is never complete and there is always some waste of material.

The Invention

The invention provides a cap made from plastics material, for protecting a valve in a keg barrel having a circular flange associated with the valve, the cap including:

- a cover plate;
- a substantially cylindrical skirt extending from the cover plate;
- a plurality of retention elements on the cylindrical skirt for engaging under the circular flange to retain the cap on the circular flange;
- at least one hinge in the cover plate; wherein bending of the cover plate at the hinge or hinges allows the retention elements to disengage from under the circular flange without damage to the retention elements, and bending at the hinge or hinges cannot occur without discernible damage to the cap.

The basic outline shape of the skirt is cylindrical because it mounts the retention elements which engage under the circular flange. However, the skirt need not be a solid cylinder and may contain windows. The only limitation is that the skirt should be sufficiently rigid that it is not possible to prize up and disengage the retention elements to remove the cap from the circular flange without causing discernible damage to the cap.

Preferably the skirt is divided into a first part extending from a portion of the cover plate on one side of a hinge and a second part extending from another portion of the cover plate on the other side of the hinge; and the two parts of the skirt are joined only by a weak connection.

By a weak connection it is meant that when a force is applied to the cap to bend the cover plate at the hinge, the weak connection snaps, allowing the two parts of the skirt to pivot away from one another. The connection should not be so weak that it can break accidentally, but an average person should be able to snap it easily.

The weak connection may consist of elements of plastics material which complete a distal circumference of the skirt remote from the cover plate. When a force is applied to the cap to cause the cover plate to bend at a hinge, these elements are placed in tension and snap, allowing the two parts of the skirt to pivot away from one another.

The discernible damage to the cap is preferably the breaking of the weak connection, and preferably the cap cannot be removed from the barrel without breaking this weak connection.

A tab may be attached to the skirt so that lifting of

the tab causes bending of the cover plate at the hinge or hinges, when the cap is in place on a keg.

The Drawings

Figure 1 is a schematic cross section of a prior art tamper-evident cap shown in place on a keg;

Figure 2 is a side view of a tamper-evident cap according to the invention;

Figure 3A is a view from the underside of a tamper-evident cap according to the invention; and Figure 3B is a view of the same cap from above;

Figure 4A is a section on line A-A of Figure 3B; and Figure 4B is a section on line B-B of Figure 3B; and

Figure 5 is a schematic cross section of a cap according to the invention showing the hinged movement.

Description with reference to the drawings

Referring to Figure 1, a prior art tamper-evident cap includes a cover plate 1 and a cylindrical skirt 2 extending from the circumference of the cover plate. Retaining elements 3 are attached to the skirt at a lower region spaced from the cover plate. When the cap is first pushed on to a keg, the retaining elements can bend slightly to allow them to pass over a circular flange 4 associated with a valve on the keg. Once the cap is pressed fully down, the retaining elements 3 grip under the circular flange 4 and retain the cap over the valve. The cap cannot be removed without damaging the retaining elements 3.

To remove the cap from the valve, a tab 5 is pulled upwards away from the keg. This may cause the retaining elements to break off individually at fracture zones 6. Alternatively, fracture zones may be provided in the region 7 where the skirt 2 meets the cover plate 1 to allow a portion of the cap containing several retaining elements to split from the rest of the cap. However the fracture zones are arranged, it is clear that some breakage of the cap will occur when removing it from the circular disc 4 to free the valve.

Referring now to Figures 2A to 5, a moulded plastics cap according to the invention includes a cover plate 1, a substantially cylindrical skirt 2 and retaining elements 3 which retain the cap on a circular flange 4 in a similar manner to the prior art. Ribs 15 help guide and locate the cap on the circular flange.

The cover plate 1 includes a hinge 8 located approximately on a diameter of the cover plate. The hinge 8 divides the cover plate 1 into first 9 and second 10 portions. A first part 11 of the skirt 2 extends from the first portion 9 of the cover plate 1 and a second part 12 of the skirt 2 extends from the second portion 10 of the cover plate. There is a gap 16 between the first 11 and second 12 parts of the skirt, which are connected only by thin strips 13 which are weak and easily broken when placed in tension.

Referring particularly to Figure 5, when a tab 14 is pulled upwards the cover plate 1 bends at the hinge 8 and the thin strips 13 snap. This allows the retaining elements 3 to move outwards and upwards to disengage from the circular flange 4 without having to bend or break. The thin strips 13 are far weaker than the retaining elements 3 and always snap before any other damage is done to the cap.

Thus a cap according to the invention does not break up when pulled off a keg, and does not cause mess or waste. It is easy for the user to re-fit the cap when the keg is empty and the entire cap can be recycled by the brewery.

It is very easy to tell when the cap has been removed and replaced because the thin strips 13 will have been snapped.

The cap of the invention is injection moulded, with a styrene based plastic being a preferred material. The hinge simply consists of a line on the cover plate along which the plastic has a reduced thickness. For ease of moulding the hinge 8 may be offset slightly so that it does not pass right through the centre of the cover plate 1.

Claims

1. A cap made from plastics material, for protecting a valve in a keg barrel having a circular flange (4) associated with the valve, the cap including:

a cover plate (1);
a substantially cylindrical skirt (2) extending from the cover plate (1);
a plurality of retention elements (3) on the cylindrical skirt (2) for engaging under the circular flange (4) to retain the cap on the circular flange;
at least one hinge (8) in the cover plate (1); wherein bending of the cover plate (1) at the hinge (8) or hinges allows the retention elements (3) to disengage from under the circular flange (4) without damage to the retention elements (3), and bending at the hinge (8) or hinges cannot occur without discernible damage to the cap.

2. A cap according to claim 1 wherein:
the skirt is divided into a first part (11) extending from one portion of the cover plate on one side of a hinge and a second part (12) extending from the other portion of the cover plate on the other side of the hinge; and the two parts of the skirt are joined only by a weak connection (13).
3. A cap according to claim 1 wherein the weak connection (13) comprises elements of plastics material which complete a distal circumference of the

skirt remote from the cover plate.

4. A cap according to claim 2 or claim 3 wherein the discernible damage to the cap includes the breaking of the weak connection (13).

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5. A cap according to any of claims 2 to 4 wherein the cap cannot be removed from the keg without breaking the weak connection (13).

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6. A cap according to any preceding claim further including a tab (14) attached to the skirt (2), wherein the tab (14) may be lifted to bend the cover plate (1) at the hinge (8) or hinges, when the cap is in place on a keg.

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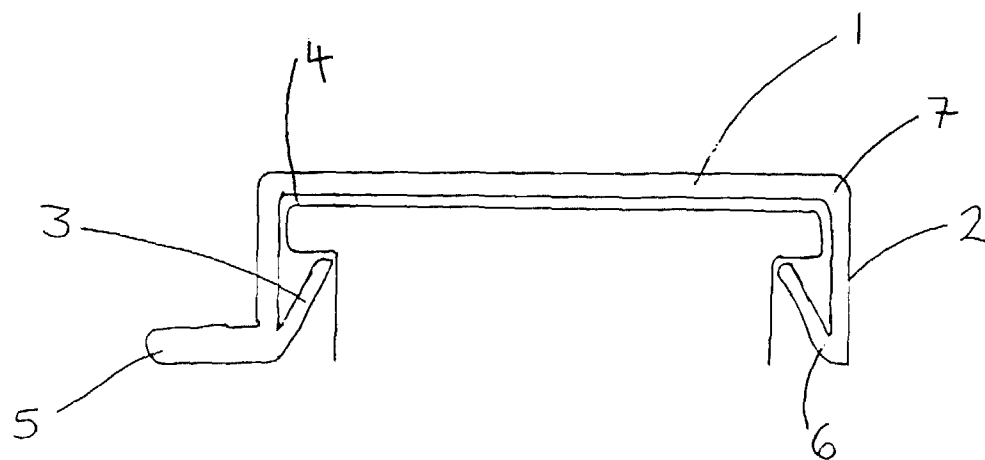


FIG 1 PRIOR ART

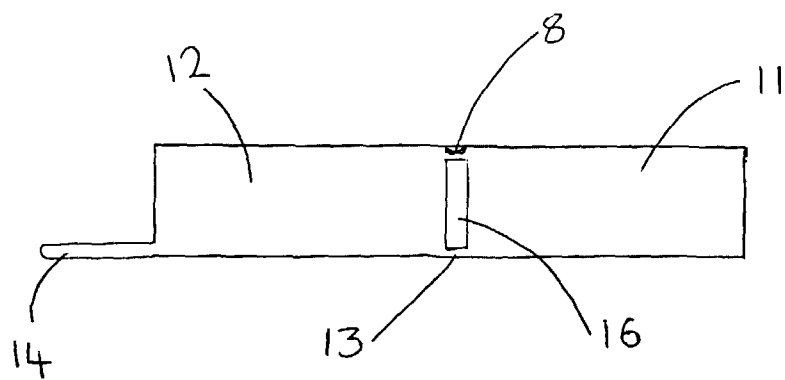
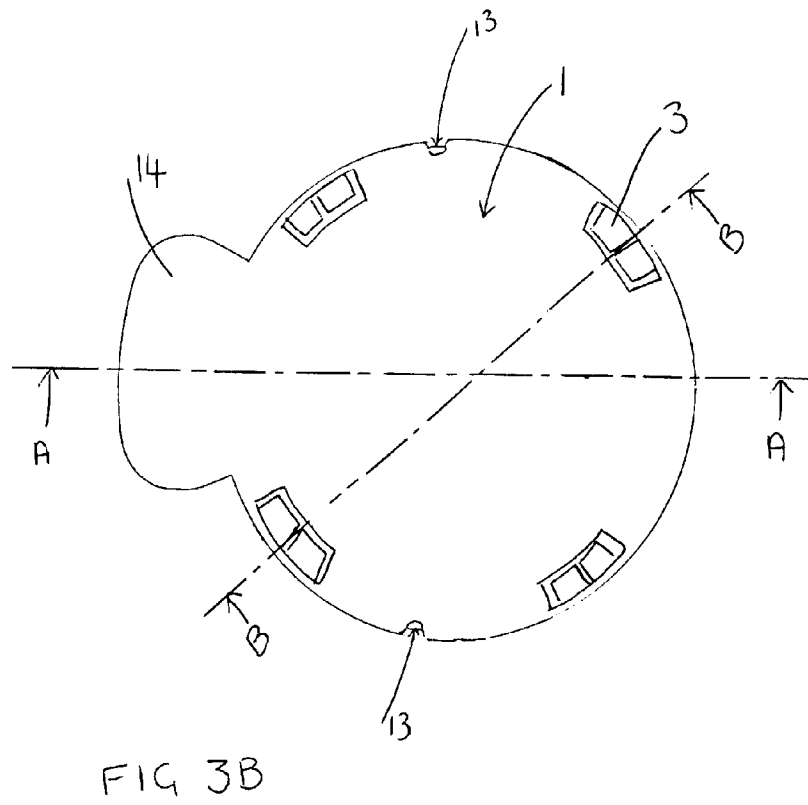
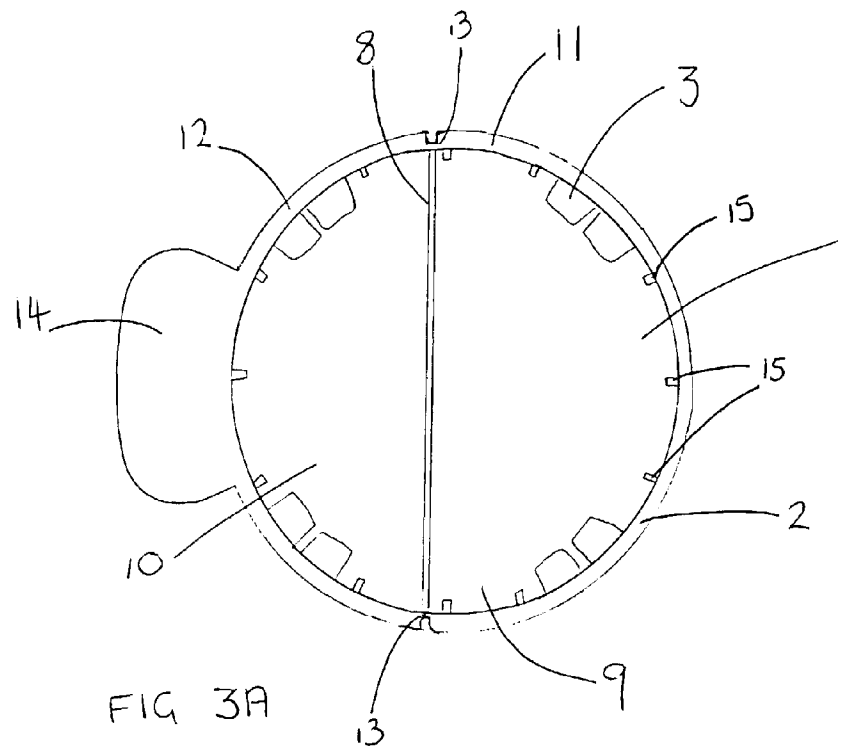


FIG 2



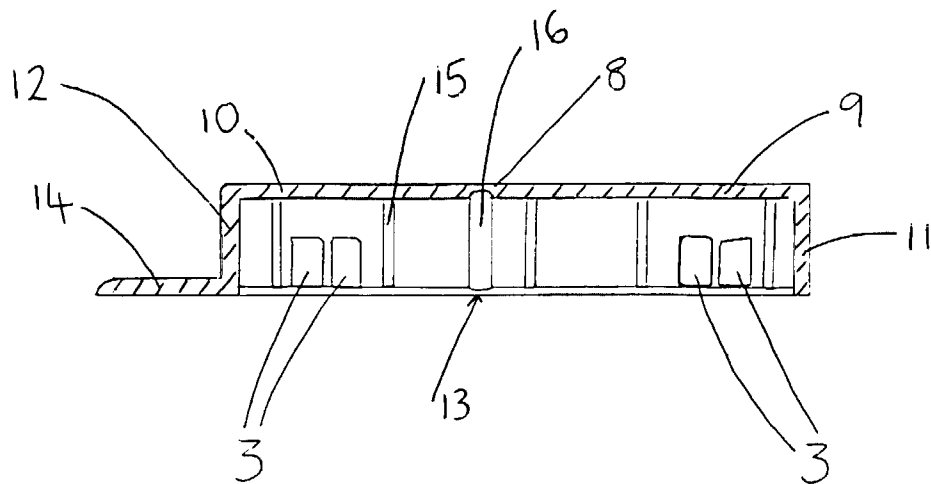


FIG. 4A

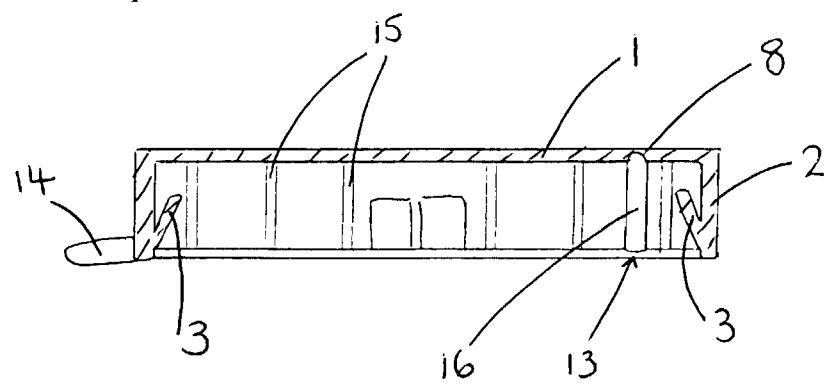


FIG. 4B

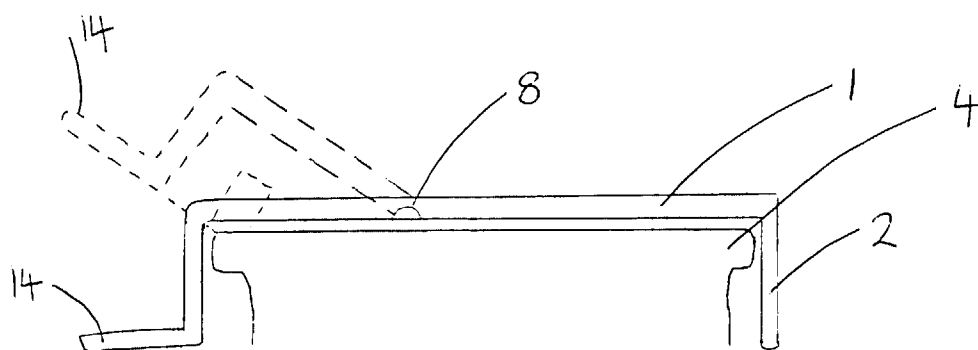


FIG 5



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EUROPEAN SEARCH REPORT

Application Number
EP 96 30 5998

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 712 705 A (FUEHRER)	1,3-6	B65D41/48
Y	* the whole document *	2	B65D43/16

Y	EP 0 004 075 A (HENKEL)	2	
	* abstract *		

P,X	WO 95 35245 A (ANCHOR HOCKING PACKAGING COMPANY)	1	
	* abstract; figures *		

A	WO 91 02686 A (AUSTRALIAN STAMPING FOILS)	1	
	* page 3, line 24 - page 4, line 20; figures 1,2 *		

A	EP 0 652 160 A (LAWSON MARDON SUTTON)	1	
	* abstract; figures *		

			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 December 1996	Smith, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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