

Description

BACKGROUND OF THE INVENTION

This invention is directed toward a novel bottle and cap closure system which is particularly well suited for use with dropper type bottles.

Many dropper type bottles presently in commercial use have an elongated tip portion that terminates with a break off tab seal. Thus, after the bottle has been filled and the break off tab seal has been applied, the contents of the bottle can not spill out nor can the contents of the bottle be contaminated by the atmosphere. Non-contamination of the bottle contents is an important consideration, particularly when the contents of the bottle is a medication which must be kept sterile until use. The break off tab seal is protected by securing a cap to the bottle to complete closure of the bottle.

Typically, the cap is secured to the bottle by means of threads provided in the cap and on the neck of the bottle so that the cap is screwed onto the bottle.

These dropper-type bottles are generally filled, the break off tab seal applied and the cap screwed onto the bottle in assembly-line fashion. Under these conditions, a cap applying apparatus is used to screw the cap onto the bottle. If the torque of the cap applying apparatus is not closely controlled and frequently monitored, the cap can be secured too loosely or too tightly. If secured too loosely, the cap can fall off during subsequent handling and shipping exposing the break off tab seal to premature removal thereby subjecting the contents of the bottle to spillage and contamination. If secured too tightly, the cap can bear upon the break off tab seal either causing its premature removal or exerting sufficient pressure to cause the relatively delicate elongated tip portion to crack. In either instance, the contents of the bottle is subject to spillage and contamination.

A bottle and cap closure system as defined in the preamble of claim 1 in known from FR-A- 2 593 146

GENERAL DESCRIPTION OF THE INVENTION

It has now been found that the disadvantages and short comings of these screw on cap systems are overcome by the bottle and cap closure system of this invention. In general, the bottle and cap closure system of the invention comprises a set of spaced lugs or cams formed on the inner circumferential surface of the cap and a set of lugs or cams formed on the outer circumferential surface of the neck of the bottle. The lower portion of the cap beneath its lugs or cams is in the form of a tear away band whose lower circumferential edge

terminates in an inwardly protruding snap bead. Sufficient distance is provided between the inner surface of the top of the cap and the snap bead so that when the cap is secured to the bottle, the top of the cap does not contact the break off tab seal.

During assembly, a bottle is positioned beneath a cap applying apparatus that lowers the cap over the break off tab seal and the elongated tip portion until the snap bead engages the lugs or cams on the neck of the bottle. The lower end of the neck of the bottle is provided with a circumferential shoulder to arrest the downward movement of the cap thereby preventing the top of the cap from contacting the break off tab seal. In this way, the break off tab seal and the elongated tip of the bottle are completely protected from accidental breakage and the contents of the bottle remain securely sealed, free from spillage or contamination, until ready for use.

When the contents of the bottle are ready to be used, the tear away band is removed, the bottle is uncapped, the break off tab seal is broken off and the contents of the bottle dispensed through the elongated tip portion. The cap is then resecured to the bottle by manually placing the cap over the elongated tip portion and manually exerting slight downward turning pressure on the cap until the lugs or cams in the cap securely engage the lugs or cams on the neck of the bottle.

DETAILED DESCRIPTION OF THE INVENTION

The novel bottle and cap closure system of the invention will become more clear from the ensuing description when considered together with the accompanying drawing wherein like reference numerals denote like parts and wherein:

Fig. 1 is a front elevation of the bottle and cap closure system of the invention shown with a dropper bottle;

Fig. 2 is a front elevation view of a typical prior art dropper bottle and cap with the cap shown in cross section for clarity;

Fig. 3 is a front elevation of the bottle and the cap closure system of the invention with the cap shown in cross section for clarity; and,

Fig. 4 is a view similar to that of Fig. 3 illustrating another embodiment of the bottle and cap closure system of the invention.

As shown in Fig. 2, a typical, commercial dropper bottle and cap comprises a cap, generally identified at 10, and a bottle, generally shown at 11, which contains the material or liquid to be dispensed from the bottle.

The upper configuration of bottle 11 generally has a tapered neck portion 12 extending upwardly from a shoulder 13 at the upper end of the body of the bottle. Extending upwardly from tapered neck

portion 12 is an elongated tip portion 14 which terminates at its upper end with a break off tab seal 15. Break off tab seal 15 is conventionally manufactured to have a geometric cross section in the form of a square, rectangular, hexagonal, and the like.

The lower portion of tapered neck portion 12 carries circumferential, helically wound continuous threads 16 which mate with circumferential, helically wound threads 17 provided on the inner surface of cap 10.

A wrench well 18 is recessed in the top of cap 10 and is formed to have the same geometric configuration as break off tab seal 15.

During manufacture and assembly, bottle 11 is filled with the material or liquid to be dispensed therefrom and break off tab seal 15 is bonded to the top of the elongated tip 14 to hermetically seal the bottle and protect its contents from spilling out. Tab seal 15 also protects the bottle contents from becoming contaminated, particularly when the bottle contains medicine which must be kept in a sterile state until use. Cap 10 is then secured to bottle 11 by screwing threads 17 onto threads 16 by means of an automatic cap applying apparatus.

As mentioned earlier, the torque of the cap applying apparatus must be closely controlled. If too much torque is imparted to the cap applying apparatus, it will tend to screw cap 10 too far down onto tapered neck portion 12 frequently causing the inner surface of cap 10 to bear upon break off seal tab 15. When this occurs, seal tab 15 can either be completely or partially broken off of tip 14 or tip portion 14 can become cracked thereby exposing the contents of bottle 11 to air contamination thus compromising the sterility of the bottle contents and/or permitting the bottle contents to leak out during subsequent handling.

If too little torque is imparted to the cap applying apparatus, the cap 10 will have tendency to become unscrewed during subsequent handling thereby exposing tab seal 15 to the possibility of being prematurely broken off.

When these prior art bottles are properly assembled, the bottle contents can be removed by manually unscrewing cap 10 and inverting it to mate wrench well 18 over tab seal 15 and then snapping tab seal 15 off by rotating cap 10 toward the body of bottle 11. The contents of bottle 11 can then be dispensed by inverting bottle 11 and permitting its contents to flow through the elongated tip portion 14.

As shown in Figs. 1 and 3, the bottle and cap closure system of the invention comprises a cap, generally indicated at 19, having a circumferential tear away band 20 at its open lower end, a circumferential score 21 where band 20 meets the main part of cap 19, and an outwardly protruding pull tab

22 formed integrally with tear away band 20 to facilitate removal of the band from the bottom portion of the cap 19. Cap 19 with band 20, score 21 and pull tab 22 are molded as a unitary article.

A plurality of circumferentially spaced, outwardly protruding lugs or cams 23 are provided on the surface of tapered neck 12 spaced upwardly from shoulder 13 a sufficient distance to frictionally engage and secure inwardly protruding, circumferential snap bead 24 formed at the open, lower edge of cap 19. In the cap 19, a plurality of circumferentially spaced, inwardly protruding lugs or cams 25 are provided upwardly from snap bead 24 and above score 21; i.e., intermediate the upper end of the tear away band 20 and the top of the cap.

Inwardly protruding lugs or cams 25 are positioned above score 21 a sufficient distance such that when tear away band 20 is removed, lugs or cams 25 can frictionally engage and be secured by and beneath outwardly protruding lugs or cams 23 on the tapered neck 12 of bottle 11.

In the embodiment shown in Fig. 4, a wrench well 18 has not been provided in top of the cap 26 and the top portion of bottle 11 is formed to have a substantially uniform, cylindrical neck portion 27 instead of a tapered neck portion 12, tip 14 and tab seal 15. In this embodiment, the open top 28 of the bottle 11 can be sealed by any suitable means such as a peelably removable foil 29.

During assembly of the bottle and cap closure system of the invention (Figs. 1 and 3), bottle 11 is stationed beneath a cap applying apparatus which places cap 19 onto bottle 11 under sufficient downward pressure until snap bead 24 engages the lower edges of outwardly protruding lugs or cams 23 with the lower end of cap 19 sitting on or closely spaced from the upper edge of shoulder 13 thereby securely locking cap 19 to bottle 11. Thus, no torque adjustment needs to be made to the cap applying apparatus to avoid screwing the cap on too tightly or too loosely. Instead, the cap applying apparatus uses a conventional piston operation whose downstroke can be readily controlled and pre-set to snap the cap onto the bottle. In addition, shoulder 13 serves to arrest the downward movement of cap 19 so that the top of the cap is prevented from contacting tab seal 15.

When the bottle contents are ready to be used, tear away band 20 can be readily removed by manually grasping pull tab 22 and cleanly tearing band 20 off of the cap 19 which is facilitated by score 21. Where the bottle is of the type shown in Figure 3, the bottle can be opened by removing the tab seal 15 using the wrench well 18 at the top of the cap as described above. Where the bottle is of the type shown in Fig. 4, the bottle can be opened by removing the top seal; in this instance, peelably removing the foil 29.

In either embodiment, the cap 19 can be re-secured to the bottle by placing the cap 19 over the top of the bottle and manually pushing down on and turning the cap 19 until inwardly protruding lugs or cams 25 engage and are secured by the lower edges of outwardly protruding lugs or cams 23 to securely lock the cap 19 to the bottle 11.

Although the bottle and cap closure system of the invention has been described with respect to bottles and caps having generally circular cross sections, it should be understood that the invention closure system is equally applicable to bottles and caps having other cross section configurations such as square, rectangular, polygonal, elliptical, oval, and the like.

Claims

1. A bottle and cap closure system comprising:

- (a) a bottle body (11) having a lower portion and an upper portion;
- (b) a cap (19) capable of being closely fitted over said upper body bottle portion;
- (c) a plurality of circumferentially spaced, outwardly protruding lugs or cams (23) intermediate the length of said upper portion; and
- (d) a circumferential tear away band (20) at the lower open end of said cap having an integrally formed circumferential, inwardly protruding bead (24) at its lower edge; characterized by
- (e) a plurality of circumferentially spaced, inwardly protruding lugs or cams (25) intermediate the upper end of said tear away band and the top of said cap

such that when said cap is placed upon said bottle with the lower end of said cap sitting on or closely spaced from the upper edge of a shoulder (13) provided on said upper body bottle portion, said bead (24) engages said outwardly protruding lugs or cams (23) on the upper portion of said bottle to secure said cap to said bottle and when said tear away band (20) is removed from said cap, said inwardly protruding lugs or cams (25) on said cap engage said outwardly protruding lugs or cams (23) on the upper portion of said bottle to secure said cap to said bottle.

2. A bottle and cap closure system according to Claim 1 characterized in that

the upper body bottle portion has the form of an upwardly extending tapered neck (12) having an elongated tip (14) extending upwardly from said tapered neck and a break off tab seal (15) at the upper end of said elongated tip; and in that said

plurality of circumferentially spaced, outwardly protruding lugs or cams (23) are provided intermediate the length of said tapered neck,

a plurality of circumferentially spaced, inwardly protruding lugs or cams intermediate the upper end of said tear away band and the top of said cap

such that when said cap is placed upon said bottle, said bead (24) engages said outwardly protruding lugs or cams (23) on said tapered neck (12) to secure said cap to said bottle.

3. A bottle and cap closure system according to Claim 2 characterized in that

the cap contains a recessed wrench well (18) in its top, said wrench well and said tab seal (15) having substantially the same geometric configuration such that said wrench well can closely engage said tab seal to facilitate removal of said tab seal.

4. A bottle and cap closure system according to Claim 1 characterized in that

the upper body bottle portion has the form of a substantially uniform, cylindrical neck portion (27) having a removable seal (29) at the upper end of said neck portion.

5. A bottle and cap closure system according to any of Claims 1 to 4, characterised in that said tear away band (20) carries an outwardly protruding pull tab (22) integrally formed therewith to facilitate removal of said tear away band from said cap and removal of said cap from said bottle.

6. A bottle and cap closure system according to any of Claims 1 to 5, characterised in that a circumferential score (21) is formed at the juncture of the upper end of said tear away band and the body of said cap.

Patentansprüche

1. Flaschen- und Kappenverschlusssystem, welches aufweist:

- (a) einen Flaschenkörper (11), welcher ein unteres Teil und ein oberes Teil hat;
- (b) eine Kappe (10), welche eng sitzend über dem oberen Flaschenkörperteil anordenbar ist;
- (c) eine Mehrzahl von in Umfangsrichtung in Abständen angeordneten, nach außen vorstehenden Ansätzen oder Nocken (23) an Zwischenstellen der Längserstreckung des oberen Teils; und



In either embodiment, the cap 19 can be re-secured to the bottle by placing the cap 19 over the top of the bottle and manually pushing down on and turning the cap 19 until inwardly protruding lugs or cams 25 engage and are secured by the lower edges of outwardly protruding lugs or cams 23 to securely lock the cap 19 to the bottle 11.

Although the bottle and cap closure system of the invention has been described with respect to bottles and caps having generally circular cross sections, it should be understood that the invention closure system is equally applicable to bottles and caps having other cross section configurations such as square, rectangular, polygonal, elliptical, oval, and the like.

Claims

1. A bottle and cap closure system comprising:

(a) a bottle body (11) having a lower portion and an upper portion;

(b) a cap (19) capable of being closely fitted over said upper body bottle portion;

(c) a plurality of circumferentially spaced, outwardly protruding lugs or cams (23) intermediate the length of said upper portion; and

(d) a circumferential tear away band (20) at the lower open end of said cap having an integrally formed circumferential, inwardly protruding bead (24) at its lower edge; characterized by

(e) a plurality of circumferentially spaced, inwardly protruding lugs or cams (25) intermediate the upper end of said tear away band and the top of said cap

such that when said cap is placed upon said bottle with the lower end of said cap sitting on or closely spaced from the upper edge of a shoulder (13) provided on said upper body bottle portion, said bead (24) engages said outwardly protruding lugs or cams (23) on the upper portion of said bottle to secure said cap to said bottle and when said tear away band (20) is removed from said cap, said inwardly protruding lugs or cams (25) on said cap engage said outwardly protruding lugs or cams (23) on the upper portion of said bottle to secure said cap to said bottle.

2. A bottle and cap closure system according to Claim 1 characterized in that

the upper body bottle portion has the form of an upwardly extending tapered neck (12) having an elongated tip (14) extending upwardly from said tapered neck and a break off tab seal (15) at the upper end of said elongated tip; and in that said

plurality of circumferentially spaced, outwardly protruding lugs or cams (23) are provided intermediate the length of said tapered neck,

a plurality of circumferentially spaced, inwardly protruding lugs or cams intermediate the upper end of said tear away band and the top of said cap

such that when said cap is placed upon said bottle, said bead (24) engages said outwardly protruding lugs or cams (23) on said tapered neck (12) to secure said cap to said bottle.

3. A bottle and cap closure system according to Claim 2 characterized in that

the cap contains a recessed wrench well (18) in its top, said wrench well and said tab seal (15) having substantially the same geometric configuration such that said wrench well can closely engage said tab seal to facilitate removal of said tab seal.

4. A bottle and cap closure system according to Claim 1 characterized in that

the upper body bottle portion has the form of a substantially uniform, cylindrical neck portion (27) having a removable seal (29) at the upper end of said neck portion.

5. A bottle and cap closure system according to any of Claims 1 to 4, characterized in that said tear away band (20) carries an outwardly protruding pull tab (22) integrally formed therewith to facilitate removal of said tear away band from said cap and removal of said cap from said bottle.

6. A bottle and cap closure system according to any of Claims 1 to 5, characterized in that a circumferential score (21) is formed at the juncture of the upper end of said tear away band and the body of said cap.

Patentansprüche

1. Flaschen- und Kappenverschlusssystem, welches aufweist:

(a) einen Flaschenkörper (11), welcher ein unteres Teil und ein oberes Teil hat;

(b) eine Kappe (10), welche eng sitzend über dem oberen Flaschenkörperteil anordenbar ist;

(c) eine Mehrzahl von in Umfangsrichtung in Abständen angeordneten, nach außen vorstehenden Ansätzen oder Nocken (23) an Zwischenstellen der Längserstreckung des oberen Teils; und



- (d) ein Umfangsabreißband (20) am unteren, offenen Ende der Kappe, welche eine einteilig ausgebildete, in Umfangsrichtung verlaufende und nach innen vorstehende Wulst (24) am unteren Rand aufweist, gekennzeichnet durch
- (e) eine Mehrzahl von in Umfangsrichtung in Abständen angeordneten, nach innen vorspringenden Ansätzen oder Nocken (25) zwischen dem oberen Ende des Abreißbandes und der Oberseite der Kappe, welche derart angeordnet sind,
- daß wenn die Kappe auf die Flasche gesetzt wird, wobei das untere Ende der Kappe auf oder in einem kleinen Abstand von dem oberen Rand einer Schulter (13) sitzt, die am oberen Flaschenkörperteil vorgesehen ist, die Wulst (24) mit den nach außen vorspringenden Ansätzen oder Nocken (23) am oberen Teil der Flasche zusammenarbeitet, um die Kappe an der Flasche festzulegen, und wenn das Abreißband (20) von der Kappe entfernt ist, die nach innen vorspringenden Ansätze der Nocken (25) an der Kappe mit den nach außen vorspringenden Ansätzen oder Nocken (23) an dem oberen Teil der Flasche zusammenarbeiten, um die Kappe an der Flasche festzulegen.
2. Flaschen- und Kappenverschlußsystem nach Anspruch 1, dadurch gekennzeichnet, daß das obere Flaschenkörperteil die Form eines nach oben verlaufenden, konisch ausgebildeten Halses (12) hat, welcher eine längliche Spitze (14) besitzt, welche sich von dem konisch ausgebildeten Hals nach oben erstreckt, sowie eine losbrechbare Zungendichtung (15) am oberen Ende der länglichen Spitze besitzt; und daß die Mehrzahl von in Umfangsrichtung in Abständen angeordneten, nach außen vorspringenden Ansätzen oder Nocken (23) an Zwischenstellen der Längserstreckung des konisch ausgebildeten Halses vorgesehen sind, sowie gekennzeichnet durch
- eine Mehrzahl von in Umfangsrichtung in Abstand angeordneten, nach innen vorspringenden Ansätzen oder Nocken zwischen dem oberen Ende des Abreißbandes und der Oberseite der Kappe derart, daß, wenn die Kappe auf die Flasche gesetzt wird, die Wulst (24) mit den nach außen vorspringenden Ansätzen oder Nocken (23) auf den konisch ausgebildeten Hals (12) zusammenarbeitet, um die Kappe an der Flasche festzulegen.
3. Flaschen- und Kappenverschlußsystem nach Anspruch 2, dadurch gekennzeichnet, daß die Kappe eine ausgenommene Schlüsselvertiefung (18) am Oberteil hat, die Schlüsselvertiefung

und die Zungendichtung (15) im wesentlichen die gleiche geometrische Ausgestaltung derart haben, daß die Schlüsselvertiefung in enger Anlage mit der Zungendichtung zusammenarbeiten kann, um das Entfernen der Zungendichtung zu erleichtern.

4. Flaschen- und Kappenverschlußsystem nach Anspruch 1, dadurch gekennzeichnet, daß das obere Flaschenkörperteil die Form eines im wesentlichen gleichmäßigen, zylindrischen Halsteils (27) hat, welches eine entfernbare Dichtung (29) am oberen Ende des Halsteils besitzt.
5. Flaschen- und Kappenverschlußsystem nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das Abreißband (20) eine nach außen vorstehende Zuglasche (22) trägt, welche einteilig hiermit ausgebildet ist, um das Entfernen des Abreißbandes von der Kappe und die Abnahme der Kappe von der Flasche zu erleichtern.
6. Flaschen- und Kappenverschlußsystem nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß eine Umfangsrille (21) an der Verbindung von dem oberen Ende des Abreißbandes und dem Körper der Kappe ausgebildet ist.

Revendications

1. Un flacon et un système de fermeture à bouchon comprenant :
- (a) un corps de flacon (11) ayant une partie inférieure et une partie supérieure ;
- (b) un capuchon (19) pouvant être fermement fixé sur ladite partie supérieure de corps de flacon ;
- (c) une pluralité de bossages ou rebords saillants (23) espacés de façon circonférentielle et se projetant vers l'extérieur, situés en position intermédiaire sur la longueur de ladite partie supérieure ; et
- (d) une bande déchirable circonférentielle (20) située au niveau de l'extrémité ouverte inférieure dudit capuchon, ayant un bourrelet (24) formé de façon intégrale, circonférentiel et se projetant vers l'intérieur, situé au niveau de son extrémité inférieure; caractérisés en ce que
- (e) une pluralité de bossages ou rebords saillants (25) espacés de façon, circonférentielle et se projetant vers l'intérieur sont situés entre l'extrémité supérieure de ladite bande déchirable et la partie supérieure dudit capuchon, de telle sorte que lorsque



ledit capuchon est placé sur ledit flacon, l'extrémité inférieure dudit capuchon reposant sur ou étant peu espacé du bord supérieur de l'épaule (13) fourni sur ladite partie supérieure du corps de flacon, ledit bourrelet (24) s'engage sur lesdits bossages ou rebords saillants (23) se projetant vers l'extérieur situés sur la partie supérieure dudit flacon afin de fixer ledit capuchon sur ledit flacon et, lorsque ladite bande déchirable (20) est enlevée dudit capuchon, lesdits bossages ou rebords saillants (25) se projetant vers l'intérieur s'engagent sur lesdits bossages ou rebords saillants (23) se projetant vers l'extérieur situés sur la partie supérieure dudit flacon afin de fixer ledit capuchon sur ledit flacon.

2. Un flacon et un système de fermeture à bouchon selon la Revendication 1, caractérisés en ce que la partie supérieure du flacon a la forme d'un goulot effilé (12), s'étendant vers le haut, ayant une pointe allongée (14) s'étendant vers le haut à partir dudit goulot effilé, et une languette de fermeture sécable (15) située sur l'extrémité supérieure de ladite pointe allongée ; et en ce que ladite pluralité de bossages ou rebords saillants (23) espacés de façon circonférentielle et se projetant vers l'extérieur sont fournis en position intermédiaire sur la longueur dudit goulot effilé,

une pluralité de bossages ou rebords saillants espacés de façon circonférentielle et se projetant vers l'intérieur étant situés entre l'extrémité supérieure de ladite bande déchirable et la partie supérieure dudit capuchon de telle sorte que lorsque ledit capuchon est placé sur ledit flacon, ledit bourrelet (24) s'engage sur lesdits bossages ou rebords saillants (23) s'étendant vers l'extérieur situés sur ledit goulot effilé (12) afin de fixer ledit capuchon sur ledit flacon.

3. Un flacon et un système de fermeture à bouchon selon la Revendication 2, caractérisés en ce que le capuchon contient un puit de clé en creux (18) au niveau de sa partie supérieure, ledit puit de clé et ladite languette de fermeture (15) ayant substantiellement la même configuration géométrique de telle sorte que ledit puit de clé puisse s'engager de façon serrée sur ladite languette de fermeture afin de faciliter le retrait de ladite languette.

4. Un flacon et un système de fermeture à bouchon selon la Revendication 1, caractérisés en ce que la partie supérieure du flacon a la forme d'une partie de goulot (27) substantielle-

ment uniforme, cylindrique ayant une fermeture sécable (29) au niveau de l'extrémité supérieure de ladite partie de goulot.

5. Un flacon et un système de fermeture à bouchon selon l'une des Revendication 1 à 4, caractérisés en ce que ladite bande déchirable (20) porte une languette pouvant être tirée (22) se projetant vers l'extérieur formée intégralement avec la bande déchirable (20) afin de faciliter le retrait de ladite bande déchirable dudit capuchon et le retrait dudit capuchon dudit flacon.

6. Un flacon et un système de fermeture à bouchon selon l'une des Revendication 1 à 5, caractérisés en ce que la rainure circonférentielle (21) est formée à la jonction entre le bord supérieur de ladite bande déchirable et le corps dudit capuchon.