2012 PAPER P3

SAMPLE SCRIPT A

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Title: Safety cap for a bottle

Field: the invention relates to safety caps for bottles.

Background: Safety caps or closures for bottles are known. They are used, for example, on medicine bottles and on other bottles containing harmful substances, such as bleach. The caps have application where it is necessary to be able to close a bottle easily, but which will not be opened inadvertently. They should be difficult for children to open.

One known safety cap is shown in Figures 1A to 1C. It is a one-piece plastic moulding, with an upper part 10 forming a normal screw threaded closure 11 which engages the screw thread on a bottle neck. The lowest part 12 of the closure, the skirt, has teeth 13 which form a ratchet like lock with ramps 14 on the neck of the bottle, below the thread. To close the bottle, the cap is screwed on in the normal way, and the teeth 13 on the inside of the cap easily ride over the ramps 14 as the cap is screwed home, locking the cap closed. To open the bottle, the cap skirt is squeezed between the teeth, to deform the skirt into an oval, so that the teeth 13 pans back over the ramps 14 as the cap is unscrewed.

Some users, particularly the elderly, find it difficult to squeeze and twist the cap at the same time. Opening a bottle fitted with the cap is difficult for these users.

Statement of the invention:

The invention provides a safety cap for a bottle comprising

- an inner closure, having an internal screw thread for engaging a screw thread on a bottle;
- an outer cap, which can be rotated about the axis of the internal screw thread;
- a locking mechanism, operable to lock the outer cap to the inner closure, so that rotation of the outer cap effects rotation of the inner closure;
- a biasing element, which biases the locking mechanism to an unlocked configuration in which rotation of the outer cap does not effect rotation of the inner closure;
- the locking mechanism being operated by an axial force pushing against the biasing element.

The cap can be screwed onto or unsecured from a bottle through simply rotating the outer cap whilst applying a pushing (axial) force to the safety cap. It has been found that it is much

easier for users (particularly elderly users) to apply pushing and twisting forces simultaneously than it is to apply simultaneous squeezing and twisting forces as required by the prior art safety caps. The configuration prevents accidental opening and is still difficult for children to open.

The safety cap may have a ratchet on one of the inner closures and the outer cap, and a complementary pawl on the other of the inner closure and the outer cap. The ratchet and pawl are configured to engage each other when the locking mechanism is in an unlocked configuration, such that rotation of the outer cap in one direction only effects rotation of the inner closure.

This arrangement means that an axial pushing force is not required to screw the cap onto a bottle. This makes closing the bottle easier.

The pawl may be a leaf spring, which also acts as the biasing element, biasing the locking mechanism towards the unlocked configuration.

Preferably, the inner closure carries the ratchet, and the outer cap carries the pawl.

There may be a plurality of pawls.

The locking mechanism may comprise mateable formations on the outer cap for engagement with mateable formations on the inner closure. The mateable formations may be castellations or teeth, which form an interlock when engaged.

The outer cap may snap-fit to the inner closure. No tether is then needed to hold the biased parts together.

The outer cap may completely cover the inner closure.

The outer cap and inner closure may each be moulded from plastic. Alternatively the inner closure may be pressed from metal, if the pawl, when present, is carried by the outer cap.

The cap preferably has a standard size, right-handed (clockwise) thread, so that it can be fit to normal, existing bottles.

The invention also provides a bottle and a safety cap as described above, arrangeable so that the cap closes the bottle.

Detailed description:

An embodiment of the invention will now be described with reference to Figures 2 to 6, in which:

- Figure 2 shows an exploded side view of the embodiment;
- Figure 3 shows an underneath view of the outer cap;
- Figure 4 shows a plan view of the inner closure;
- Figure 5 shows a side view of the embodiment in which the outer cap and inner closure are in an unlocked arrangement; and
- Figure 6 shows a side view of the embodiment on which the outer cap and inner closure are in a locked arrangement.

Figure 2 shows a safety closure 1, which is an embodiment of the invention. (The view has been exploded.) The safety cap has two elements; an inner cap 30 and an outer cap 20. Both are round.

The inner cap 30 has an internal screw thread 33 to mate with a screw thread 41 provided on a bottle 40. When mated, the inner cap 30 closes the bottle 40.

Eight upstanding ribs 32 are provided on the top, outer surface of the inner cap 30. The ribs extend radially and are evenly distributed around the top outer surface of the inner cap.

Eight curved teeth 31 are provided around the circumference of the top, outer surface of the inner cap 30. The teeth 31 are evenly spaced around the circumference. The teeth curvature matches the curvature of the inner cap 30.

The outer cap 20 has a top wall 25 and an annular side wall 24. It fits over the inner cap 30, as shown in Figures 5 and 6. At the bottom end of the side wall 24, an inwardly projecting lip 23 is provided, which retains the inner cap 30 in the outer cap 20, as shown in Figures 5 and 6.

Eight curved teeth 21 project vertically downwards from the underside of the other cap's top wall 25. These are formed against the annular side wall 24 and are evenly spaced.

Four curved springy arms 22 project downwards from the underside of the outer cap's top wall 25. These are resiliently deformable. The arms 22 are angled relative to the teeth 21. The arms 22 curve downwards in a clockwise direction.

Both the outer cap 20 and inner cap 30 are formed from moulded plastic.

In use, the outer cap 20 and inner cap 30 are snap-fit together. The caps are urged apart by the springy arms 22 of the outer cap which press against the inner cap 30. If the outer cap 20 is screwed clockwise, the springy arms engage and lock against the ribs 32 of the inner cap 30. This effects rotation of the inner cap 30, which advances the internal screw thread 33 so that it mates with the screw thread 11 of the bottle 40.

If the outer cap 20 is screwed anticlockwise, the springy arms 22 are depressed by the ribs 32 and simply ride over them. No rotation of the inner cap is effected, and it is therefore not unscrewed. The safety closure 1 remains in place, covering and closing the bottle 40. This configuration is shown in Figure 5.

To remove the closure 1 and open the bottle 40, downward pressure is applied to the outer cap 20, as shown in Figure 6. The springy arms 22 are bent by this pushing. The teeth 21 of the outer cap 20 form an interlock with the teeth 31 of the inner cap 30. Rotation of the outer cap 20 in either direction (clockwise or anticlockwise) causes rotation of the inner cap 40. Anticlockwise rotation of the outer cap 20 unscrews the inner cap 30, and opens the bottle 40.

Of course, simple variants may occur to a skilled person. For example, the outer cap does not need to completely cover the inner cap; the top wall 25 could have an opening in the centre. In this embodiment, the user could still not apply a twisting force to the inner cap directly,

because the outer cap is covering the side walls of the inner cap. Thus, functionality as a safety closure is maintained.

In a further alternative, the bottle screw thread and inner cap internal thread are left-handed, i.e. engaged by anticlockwise rotation of the inner cap. In this embodiment, the spring arms curve downwardly in an anticlockwise direction.

CLAIMS:

1. A safety cap for a bottle, the cap comprising
- an inner closure, having an internal screw thread for engaging a screw thread on a bottle;
- an outer cap, which can be rotated about the axis of the internal screw thread;
- a locking mechanism, operable to lock the outer cap to the inner closure, so that rotation of the outer cap effects rotation of the inner closure;
- a binding element, which biases the locking mechanism to an unlocked configuration in which rotation of the outer cap does not effect rotation of the inner closure, the locking mechanism being operated by an axial force pushing against the biasing element.

2. A safety cap according to claim 1, wherein
- one of the inner closure and the outer cap carries a ratchet
- and the other carries a complementary pawl
- the ratchet and pawl being in engagement when the locking mechanism is in an unlocked configuration, so that rotation of the outer cap in one direct5ion only effects rotation of the inner closure.

3. A safety cap according to claim 2, wherein the pawl is a leaf spring, which also serves as the biasing element, biasing the locking mechanism towards the unlocked configuration.

4. A safety cap according to claim 2 or claim 3, wherein the inner closure carries the ratchet, and the outer cap carries the pawl.

5. A safety cap according to any preceding claim, wherein the locking mechanism comprises mateable formations on the outer cap engageable with complementary mateable formations on the inner closure.

6. A safety cap according to claim 5, wherein the mateable formations comprise interlockable teeth.

7. A safety cap according to any preceding claim, wherein the outer cap snap-fits to the inner closure.

8. A safety cap according to any preceding claim wherein the outer cap completely covers the inner closure.

9. A safety cap substantially as described herein, with reference to, and as illustrated in the accompanying Figures 2 to 6.

10. A kit of parts comprising a bottle and a safety cap according to any preceding claim, the bottle and cap being arrangeable so that the cap closes the bottle.

11. A kit of parts substantially as described herein.

Abstract

Title: Safety cap for a bottle.

A safety cap 1 has an inner cap 30 and an outer cap 20, which are biased apart, each having teeth 31, 21 which form an interlock only when the outer cap 20 is pushed down, such that rotation of the outer cap 20 by a user then rotates the inner cap.

The safety cap 1 is opened by pushing and twisting the outer cap 30, but is not opened in the absence of a pushing force. The cap is easy to open, particularly for the elderly, whilst preventing inadvertent opening by children.

[Accompanied by Figure 5.]

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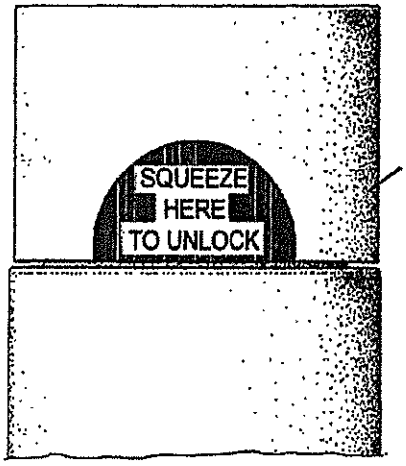

FIG 1A

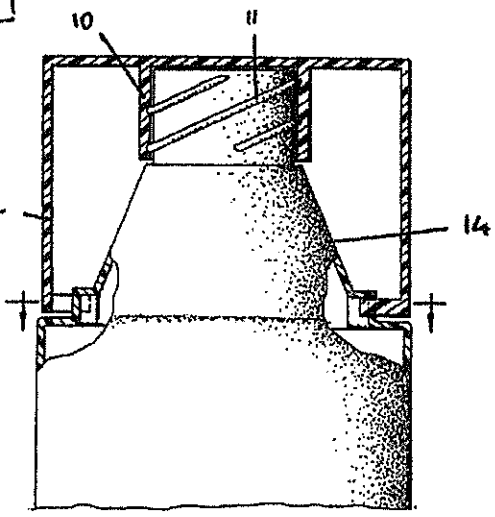

FIG 1B

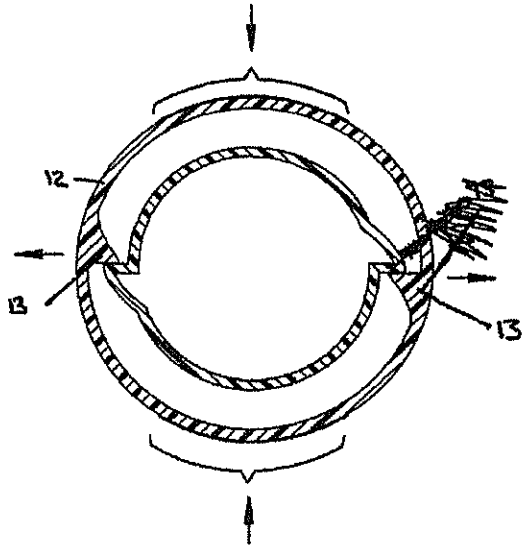

FIG 1C

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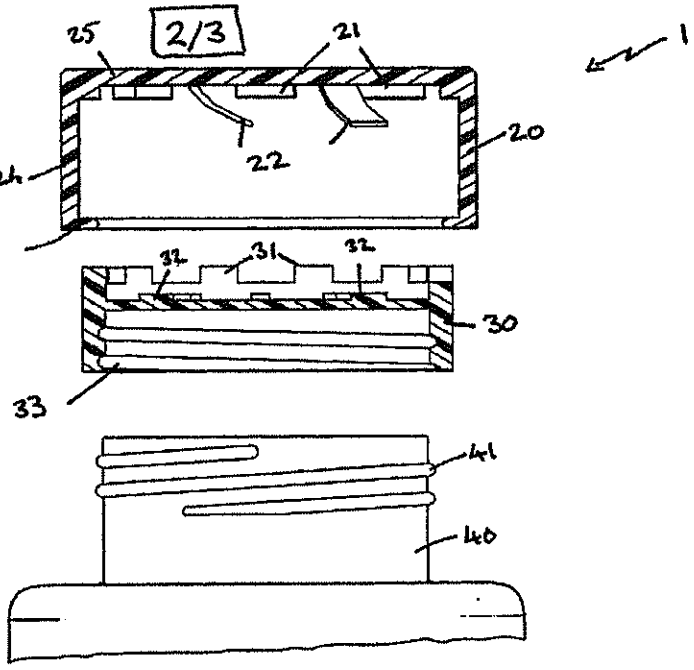

FIG 2

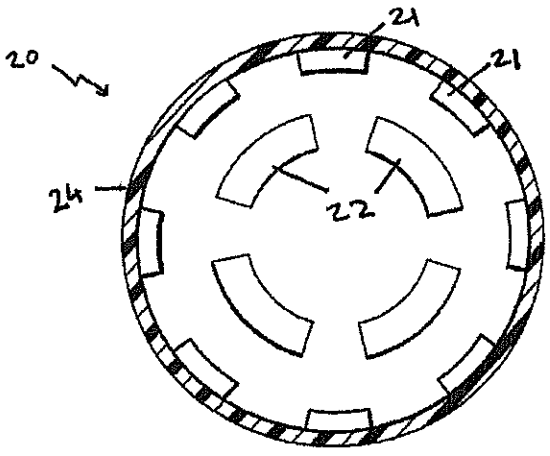

FIG 3

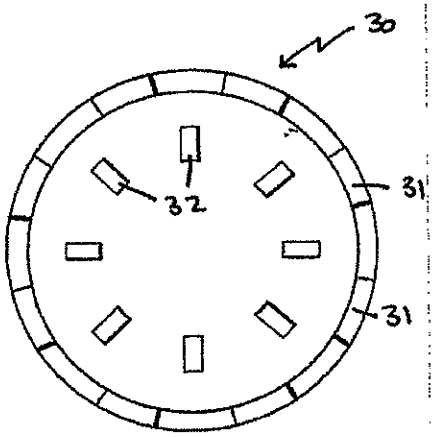

FIG 4

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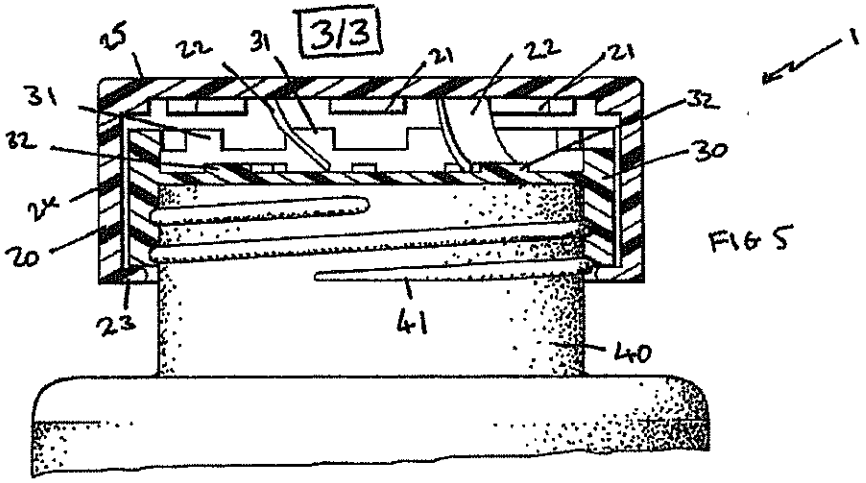

FIG 5

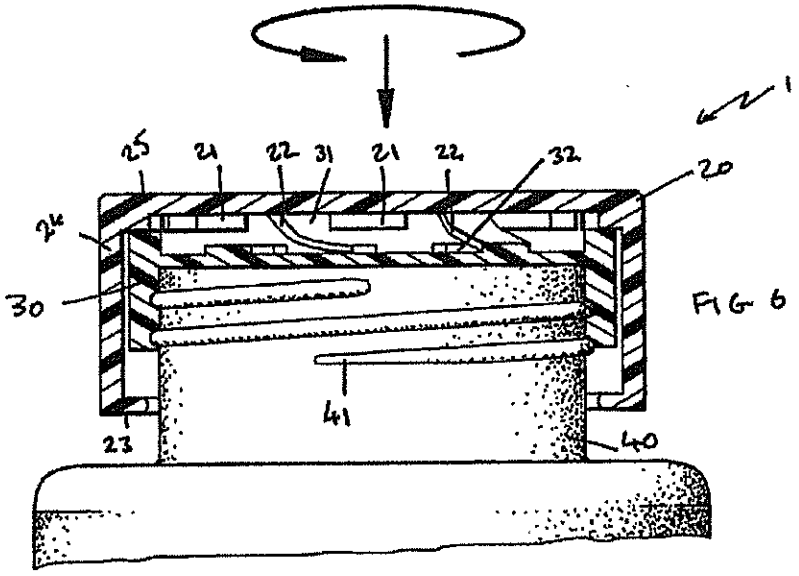

FIG 6

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SAMPLE SCRIPT B

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PAPER: P3

A Safety Bottle Cap

The invention provides a safety bottle cap. Specifically, the invention provides a safety bottle cap for medicine bottles. The invention also contemplates application of the safety bottle cap for bleach bottles.

Safety bottle caps must be easy to close but difficult to open, primarily to stop children gaining access to any harmful contents. Figures 1-3 show a known safety cap used to close bottles of bleach. The safety cap 10 is a single piece of moulded plastic with an upper part 12 forming a screw threaded closure which engages with a screw thread of the bottle neck. The lower part of the cap, the skirt 14 has teeth 16 which form a ratchet like lock with ramps 18 on the neck of the bottle, below the thread.

In order to unscrew the cap, the skirt 14 must be squeezed at the points indicated in Fig. 1 which are between the location of the teeth. Squeezing the skirt causes the skirt to deform into an oval and causes the teeth 16 to clear ramps 18 and the cap can be unscrewed.

Safety caps described above have the disadvantage that many elderly people have difficulty squeezing the cap and twisting at the same time. This could lead to attempts to force the cap to unscrew which could damage the teeth or ramps resulting in an ineffective safety cap that can be unscrewed without squeezing the skirt. The present invention solves these problems.

According to a first aspect of the invention there is provided a safety cap according to claim 1. Advantageously, this safety cap does not rely on a squeezing force but a downward force applied axial to the cap to allow the cap to be unscrewed. An elderly person can more easily apply a downward force axial to the cap and twist than squeeze the cap and twist.

This advantage is provided by a two part safety cap.

The safety cap can also not be forces in the same way as the prior art safety cap.

In embodiments of the invention there is provided a safety cap of claim 2. The screw thread engaging means allow the cap to be applied to a normal bottle used routinely.

In embodiments there is provided a safety cap of claim 3. The snap fit containment of the inner part in the outer part is simple to accomplish. The snap fit is also advantageously easy

to engage but difficult to disengage. Hence, providing a simple way to circumvent tampering with the safety cap.

Preferably, there is provided a safety cap of claim 4. The communication of the teeth, castellations or crenulations allows a rotational force, applied to the outer part, to be transferred into the inner part when turned in any direction. Hence allowing the safety cap to be unscrewed.

Preferably, there is provided a safety cap of claim 5. The projections and ribs provide a simple yet effective ratchet system.

Preferably, there is also provided a safety cap of claim 6. The projections may also urge the two parts of the safety cap apart stopping the interacting means, for example the teeth, castellations or crenulations, from coming into contact except when the user specifically applies a force. The projections may therefore perform the role of part of the ratchet system and the role of urging the interacting means apart. In an alternative embodiment a spring urges the two interacting means apart.

Preferably, the invention provides a safety cap of claim 7. This arrangement of the projections and ribs is preferred. With this arrangement the inner part may be made from metal.

In embodiments there is provided a safety cap of claim 8. The flexible arms provide a way to urge the interacting means apart and at the same time perform the ratchet function. The arms can also be moulded from a single piece of plastic.

Preferably the outer part is plastic. The inner part may be plastic. It is also contemplated that the inner part is made of metal when the outer part comprises the projections. This metal inner part provides a stronger piece of the cap.

The plastic outer part and the plaster inner part may be independently a single piece of plastic, preferably moulded plastic.

Plastic parts have the advantage of being easily manufactured and cheap.

In a second aspect of the invention there is provided a safety bottle of claim 12.

The invention will now be described, by way of example only, with reference to the Figures:

Figure 1 is a side view of a prior art safety cap.
Figure 2 is a side sectional view of the prior art safety cap of Fig. 1.
Figure 3 is a sectional view along line 1-1 of Figure 2.
Figure 4 is an exploded side section view of the cap of the invention including a bottle.
Figure 5 is an underneath sectional view along 2-2 of the outer part of the safety cap of the invention.
Figure 6 is a top view of the inner part of the safety cap of the invention.
Figure 7 is a sectional view of the invention attached to a bottle.
Figure 8 is a sectional view of the invention when a downward force has been applied along the axis of the safety cap.

Like reference numerals will be used for like features.

Referring to Figures 4-6 there is provided a safety cap 100 having two parts 20, 22, an inner part 22 and an outer part 20. Inner part 22 is contained in outer part 20 by protrusion 30 which extends a short way towards the centre of outer part 20 along the circumference of 20. Outer part 20 resembles a standard cap but lacks a screw thread to engage a screw thread of a bottle 200.

Inner part 22 is provided with a screw thread 22 to engage with bottle 200. By which means the two parts 20, 22 are engaged with bottle 200.

Outer part 22 has projections 26 extending from its internal surface towards the inner part 20. The projections 26 are flexible arms formed of a single piece of plastic integrally with the outer part. The projections communicate with ribs 28 which protrude from the inner part towards the outer part.

The inner part 22 and outer part 20 also have teeth 24, 25. The teeth 25 of the inner part extend towards outer part 20 and the teeth 24 of outer part 20 extend towards inner part 22. The teeth 24, 25 are positioned to allow gaps 34, 35 there between. The teeth 24, 25 enter the gaps 34, 35 of the other part.

Referring now to Figure 7, when in use the safety cap is fitted to a bottle, 200 via the screw thread (32, Fig. 4) of inner part 22. Teeth 24, 25 are not in communication with the corresponding gaps 34, 35. When the cap 100 is closed and the outer part 20 is rotated about the central axis of the cap 100 to unscrew the cap 100 flexible projections 26 deform and pass over ribs 28 causing outer part 20 to rotate but not inner part 22.

Conversely, when the cap 100 is not on the bottle 200 and is screwed on by rotating the outer part 20 around the central axis of the cap, the ribs 28 are rigidly engaged by the projections 26 causing the inner part 22 to rotate concomitantly with outer part 20.

With reference to Fig. 8, in order to unscrew the safety cap 100, a downward force must be applied along the axis of the cap to outer part 20, as indicated by arrow 40 in Fig. 8. Such a downward force engages teeth 24, 25 into the corresponding gaps 34, 35. The flexibility of projections 26 allows them to flatten when the downward force is applied. With application of the downward force and engagement of teeth 24, 25 the outer part 20 can be rotated, indicated by arrow 42, and the rotation is transferred to inner part 22 causing the safety cap 100 to unscrew from the bottle.

In an alternative embodiment the ratchet system comprises a spring to urge the teeth apart.

1. A safety cap for bottles comprising two parts, an inner part, having means for engaging with a bottle neck, contained in an outer part,

wherein each of the two parts independently comprise means to interact with the other part

and the two parts comprise a ratchet system adapted to allow singular rotation of the outer part in one direction and concomitant rotation of the two part in an opposing direction,

wherein the safety cap comprises means to urge the interacting means of the two parts apart, wherein the urging means are configured to allow the interacting means to come into communication when a downward force is applied along the axis of the safety cap in use.

2. A safety cap of claim 1 wherein the means for engaging with a bottle neck is a screw thread.

3. The safety cap of claim 1 or claim 2 wherein the inner part is contained in the outer part by a snap fit interaction.

4. A safety cap of any preceding claim wherein the two parts comprise teeth, castellations or crenulations

wherein the teeth, castellations or crenulations are configured to come into communication with the teeth, castellations or crenulations of the other of the two parts when the downward force is applied along the axis of the safety cap.

5. A safety cap of any preceding claim wherein the ratchet system comprises a number of projections on the outer part or the inner part adapted to communicate with a number of ribs on the other part, so as to allow singular rotation of the outer part in one direction and concomitant rotation of the two parts in an opposing direction.

6. A safety cap of claim 5 wherein the means to urge the interacting means of the two parts apart are the projections.

7. A safety cap of claim 5 or claim 6 wherein the outer part comprises the number of projections and the inner part comprises the number of ribs.

8. A safety cap of any of claims 5-7 wherein the projections are flexible arms configured to deform past the ribs when the outer cap is rotated in one direction and to rigidly engage with the ribs when the outer cap is rotated in an opposing direction.

9. A safety cap of any proceeding claim wherein the inner part is plastic.

10. A safety cap of claim 7 wherein the inner part is metal.

11. A safety cap of any preceding claim wherein the outer part is plastic.

12. A safety bottle comprising a bottle reversibly engaged with a safety bottle cap of any preceding claim.

13. A safety cap substantially as described herein with reference to Figures 4-8.

14. A safety cap of claim 8 wherein the outer part is a single piece of moulded plastic and the inner part is a single piece of moulded plastic.

Abstract

A Safety Cap

The safety cap 100 has two parts 20 and 22, and inner part 22 contained in an outer part 20. The two parts 20, 22 have teeth 24, 25 which communicate when a downward force is applied along the axis of the cap to the outer part 20. When the downward force is applied a

user can unscrew the cap 100 from a bottle. When no downward force is applied projections 26 and ribs 28 allow the cap 100 to be screwed onto a bottle but not unscrewed.

(Fig. 4)

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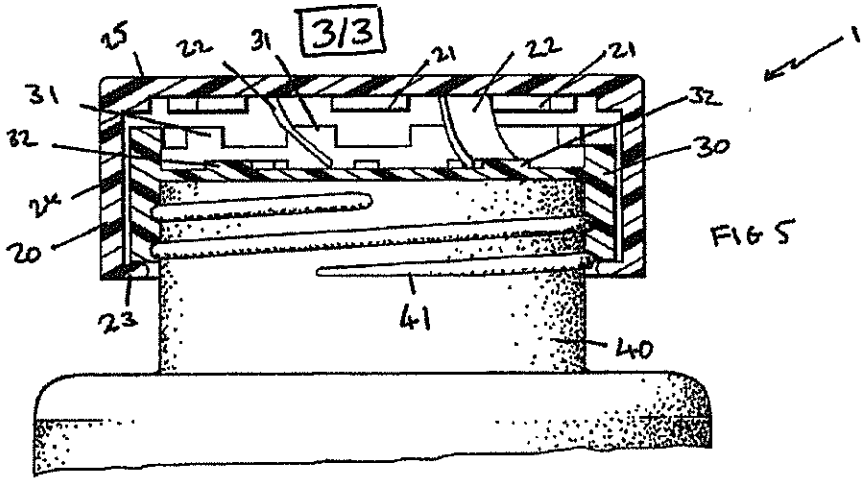

FIG 5

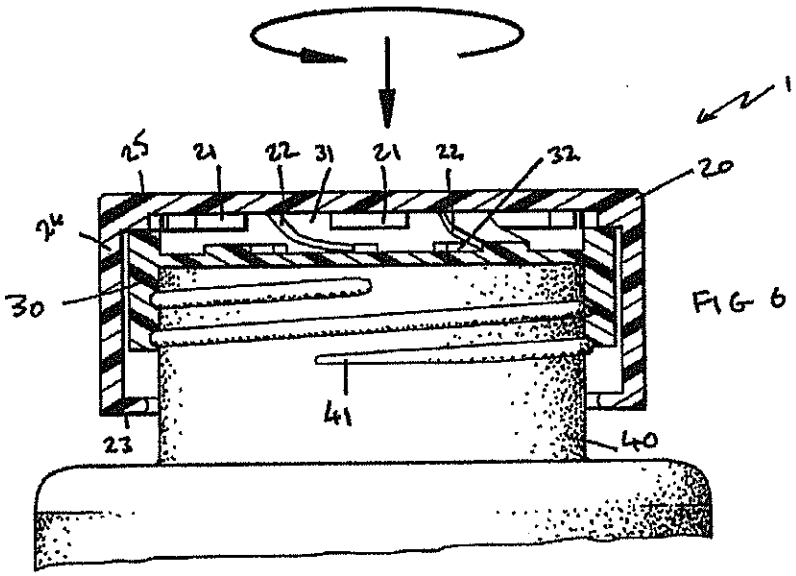

FIG 6

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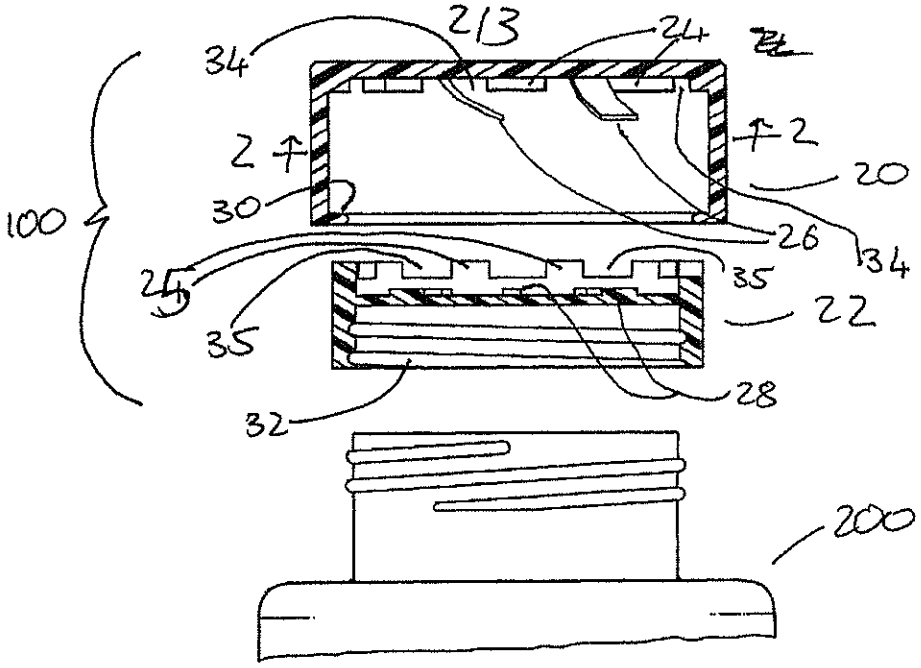

Fig. 4

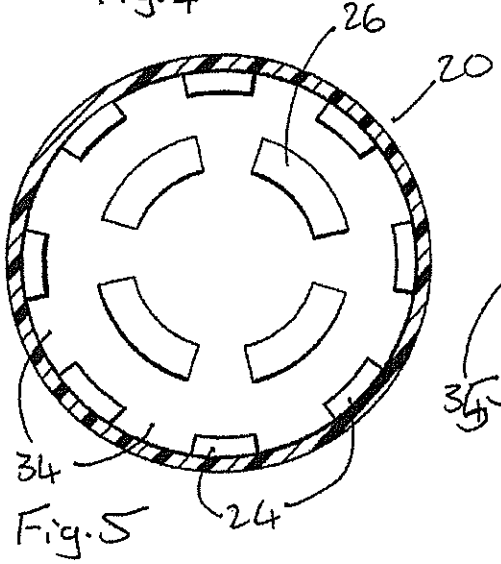

Fig. 5

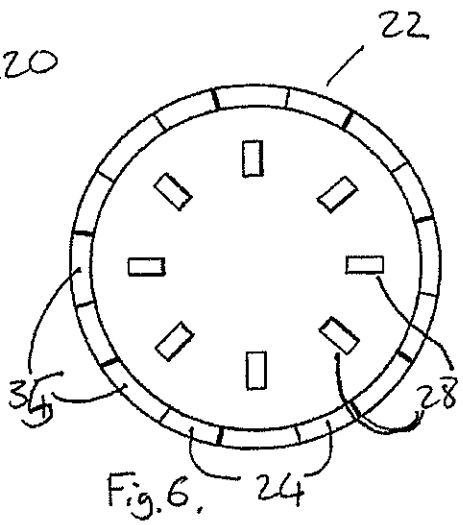

Fig. 6.

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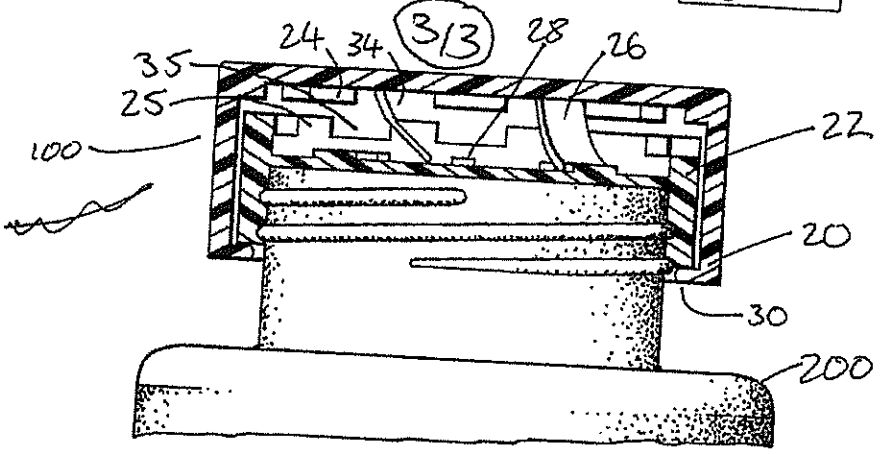

Fig.7

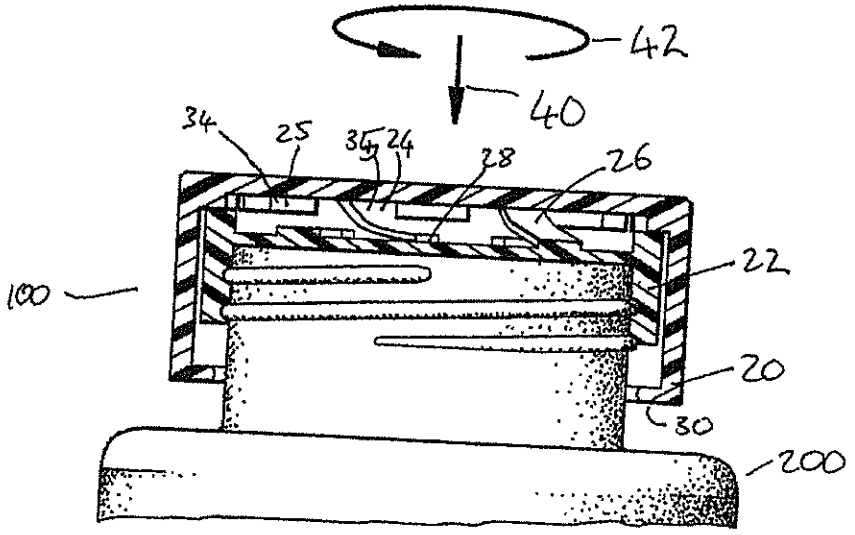

Fig.8

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SAMPLE SCRIPT C

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PAPER: P3

A SAFETY CLOSURE

The present invention relates to a safety closure and in particular a safety closure for containers for hazardous material.

It is important that safety closures for containers of potentially hazardous materials are easy to close, but difficult for children to open.

A prior art safety closure that provides such qualities is shown in Figures 1 to 3. The closure is in one piece and moulded from plastic. An upper part forms a normal screw thread closure which engages on a bottle neck. The closure is further provided with a skirt having teeth which engage with ramps on the neck of the bottle to form a ratchet. To close the bottle, the cap is screwed on in the normal way, and the teeth easily ride over the ramps, locking the cap closed.

To uncap the bottle, one must squeeze the cup skirt in between the locations of the teeth. This deforms the skirt into an oval so that the teeth can pass back over the ramps as the cap is unscrewed.

Whilst this mechanism is effective for most able bodied people, many elderly people find it difficult to squeeze the cap such that the teeth disengage sufficiently whilst simultaneously unscrewing the closure. This is a particular problem for the elderly or infirm who need to access the contents of a bottle containing, for example, medicine.

According to a first aspect of the invention, there is provided a safety closure according to claim 1. Thus, when the safety closure is threaded onto a container, rotation of the outer cap does not cause the inner cap to unscrew from the container, unless axial pressure is applied to the top of the outer cap. This means that children are unable to remove the closure from a container onto which it is screwed and the elderly or inform need only depress the closure whilst twisting it open to engage the engagement portions so that the inner cap unscrews. This removes the issue of having to squeeze the closure associated with previous safety closures, leading to a more user friendly device for the elderly and inform, whilst still posing a difficulty to children.

The engagement portions are perfectly located on the inside of the top of the outer cap, and the outside of the top of the inner cap so that they can easily engage when the closure is depressed by a user.

Advantageously, the safety closure further comprises a ratchet to prevent relative rotation of the inner and outer caps in a first direction, but allow relative rotation of the inner and outer caps in a second direction opposite to the first direction, the second direction being an unthreading direction.

Thus to thread the closure into a container, the user need not depress the outer cap to engage the engagement portion. The ratchet provides the relative torque between the inner and outer caps during the thread in to a container, but remains disengage where the outer cap is rotated so as to try and unthread the closure from a container.

Preferably, the ratchet comprises one or more projections on one or more of the inner cap and the outer cap, and one or more protrusions on the other one of the inner cap and the outer cap, so as to provide the ratchet effect discussed above.

Advantageously, the engagement portions are resiliently biased into a disengaged configuration by the one or more projections.

Thus, the projections provide two functions – biasing the engagement portions and providing a ratchet effect, thereby reducing material costs over simplifying the design.

Preferably, one or more of the inner cap and the outer cap are moulded from plastic, thus reducing cost and increasing manufacturing efficiency.

Alternatively or in addition, the inner cap may be pressed from metal. This may be of particular use where the contents of the container onto which the safety closure is to be fitted is particularly hazardous or corrosive, and thus a plastic cup is unsuitable. However, in such a scenario, the one or more projections would likely be mounted or integrated into an outer cup made of plastic, since these need to be resilient such that they ride over protrusions of the ratchet.

Advantageously, the safety closure's thread it suitable for engagement with any standardised medicine bottle, so that the closure can be retrofitted onto standard bottles already in circulation, and the design of present medicine bottles need not be altered.

The present invention shall now be described by way of non-limiting example only with reference to the accompanying figures, in which:

Figure 1 shows a side view of a safety closure according to the prior art, fitted onto a bottle.

Figure 2 shows a cross-sectional view of the safety closure in Figure 1.

Figure 3 shows a plan view of the safety closure shown in Figures 1 and 2.

Figure 4 shows an exploded cross section of a safety closure according to an embodiment of the present invention, above a prior art bottle neck.

Figure 5 shows a plan view from the bottom of the outer cap of the safety closure of Figure 4.

Figure 6 shows a plan view from the top of the inner cap of the safety closure shown in Figure 4.

Figures 7(a) illustrates the function of the safety closure of Figures 4 to 6, when being threaded onto or off a bottle neck, when downward force is applied.

Figure 7(b) illustrates the function of the safety closure shown in Figures 4 to 6 with downward axial force applied to the closure.

A safety closure 10 according to an aspect of the present invention is shown in Figure 4.

The closure 10 comprises an inner cap 12 and an outer cap 14.

The inner cap 12 has an internal thread 16 suitable for threading onto any known threaded container aperture 18. The inner cap 12 further comprises an upper lip 20 around its top edge into which are cut a plurality of teeth 22. In the recess 24 defined by the upper lip 20 are disposed a plurality of ribs 26 arranged in a radial pattern, equally spaced from one another and the axial centre of the inner cap. This pattern is shown more clearly in Figure 6.

Referring back to Figure 4, the outer cap 14 of the safety closure 10 has an internal diameter which just slightly exceeds the external diameter of the inner cap 12, and at the lower edge of outer cap 14 is provided an inwardly facing hinge 28. In use, the inner cap 12 is filled inside of the outer cap 14, the flange snapping over the bottom edge 30 of the inner cap 12 to prevent the inner and outer caps 12, 14 from separating.

The outer cap has a plurality of teeth 32 disposed around the top inside edge of its interior, these teeth being of suitable dimensions and situation to interlock with the teeth 22 disposed on the upper lip 20 of the inner cap 12, when the two caps 12 and 14 are snapped together in use.

The outer cap 14 further comprises a plurality of equally spaced projections 34 arranged in a circle axially centred on the outer cap 14, as shown in more detail in Figure 5. The projections are fixed to the outer cap at one end and project at an acute angle with respect to the inside top of the outer cap 14.

In use, as shown in Figure 7, the inner and outer caps 12, 14 of the safety closure 10 are snapped together by association of the flange 28 with the bottom edge 30 of the inner cap.

Figure 7(a) shows a configuration where no axial force is applied to the safety closure 10. In this configuration, the projections engage with the recess 24 of the inner cap 12, in line with the ribs 26 disposed thereon. However, the teeth 22, 32 of the inner and outer caps 12, 14 or disengaged due to the force of the projections 34 which engage with the recess 24 biasing the teeth 22, 32 out of their interlocking configuration.

When the outer cap 14 is rotated in a clockwise direction the projections 34 engage with the ribs 26 creating a torque on the inner cap 12 which tightens the closure 10. However, when the outer cap is rotated anti clockwise, then the projections 34 do not engage with the ribs 26, but simply ride over the top such that no torque is applied to the inner cap 12 – the outer cap 14 is free to rotate relative to the inner cap 12.

Turning now to Fig. 7(b), an axial (downward) force is applied to the closure 10, the teeth 22, 32 interlock, thus allowing torque to be transferred from the outer cap 14 to the inner cap 12, regardless of the direction of rotation. A user can therefore unscrew the cap and get to the contents of the bottle.

It will be appreciated that the embodiments of the invention are possible without diverging from the scope of protection of claims.

For example, although in embodiments described herein the inner cap has an internal thread, in other embodiments the cap may have an external thread for engagement with internally threaded container apertures.

Additionally, although the projections 34 are shown to be on the outer cap 14 the invention could work equally well with the projections incorporated into the inner cap 12, and the ribs situated on the roof of the outer cap 14.

1. A safety closure, comprising:
an inner cap having a thread; and
an outer cap arranged coaxially around the inner cap;
the inner and outer caps having mutually interlocking engagement portions resiliently biased into a disengaged configuration,
wherein relative axial force between the inner and outer caps causes the engagement portions to engage, thereby preventing relative rotation of the inner and outer caps.

2. A safety closure according to claim 1, wherein the engagement portions are situated on the inside of the top of the outer cap, and the outside of the top of the inner cap.

3. A safety closure according to claims 1 or 2, wherein the engagement portions are teeth or castellations.

4. A safety closure according to any preceding claim, further comprising a ratchet to prevent relative rotation of the inner and outer caps in a first direction, but allow relative rotation of the inner and outer caps in a second direction opposite to the first direction, the second direction being an unthreading direction.

5. A safety closure according to claim 4, wherein the ratchet comprises one or more projections on one of the inner cap and the outer cap, and one or more protrusions on the other one of the inner cap and the outer cap.

6. A safety closure according to claim 6, wherein the one or more projections Ride over the one or more protrusions in the first direction to permit relative rotation of the inner and outer caps, but engage with the one or more protrusions in the second direction to prevent relative rotation of the inner and outer caps.

7. A safety closure according to any of claims 5 or 6, wherein the one or more projections are springy arms.

8. A safety closure according to any of claims 5 6 7, wherein the one or more protrusions are ribs.

9. A safety closure according to any of claims 6 to 8, wherein the engagement portions are biased into the disengaged configuration by the one or more projections.

10. A safety closure according to claim 9, wherein the projections are arranged to promote axial separation of the inner and outer caps.

11. A safety closure according to any preceding claim, wherein one or both of the inner cap and the outer cap are moulded from plastic.

12. A safety closure according to any of claims 1 to 10 wherein the inner cap is pressed from metal.

13. A safety closure according to any preceding claim, wherein the thread is internal to the inner cap.

14. A safety closure according to any preceding claim, wherein the thread is suitable for engagement with any standardised medicine bottles with threaded necks.

15. A medicine bottle comprising a safety closure according to my preceding claim.

16. A bleach bottle comprising a safety closure according to any of claims 1 to 14.

17. A safety closure as substantially described herein with reference to Figures 4 to 7.

A SAFETY CLOSURE

A safety closure 10 for containers of hazardous material is provided, comprising an inner cap 12 with a thread 16 and an outer cap 14 which coaxially surrounds the inner cap 12. Depression of the outer cap 14 towards the inner cap 12 causes the two caps 14 to engage such that the safety closure 10 can be unscrewed from a hazardous container aperture, but prevents the inner cap 12 from being unscrewed when axial force is not provided on the outer cap 14, thus preventing the elderly or inform to reach the contents with little force.

(Fig. 4)

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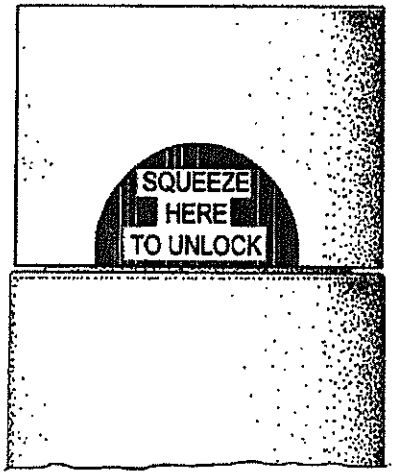

Fig 1

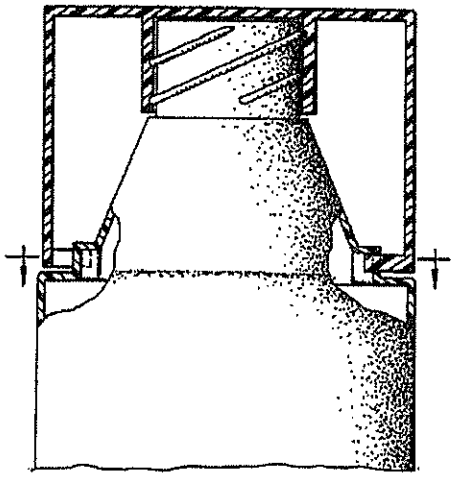

Fig 2

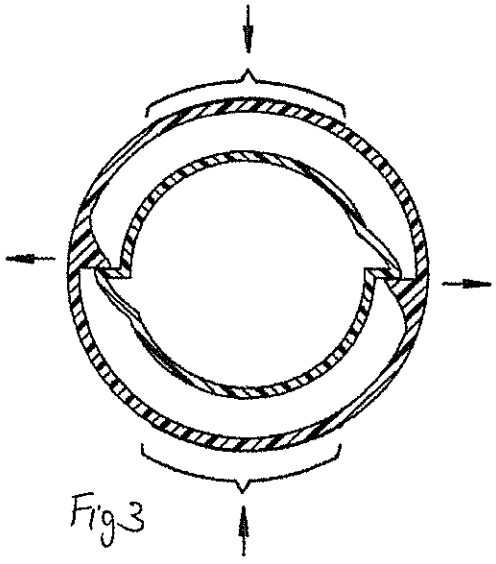

Fig 3

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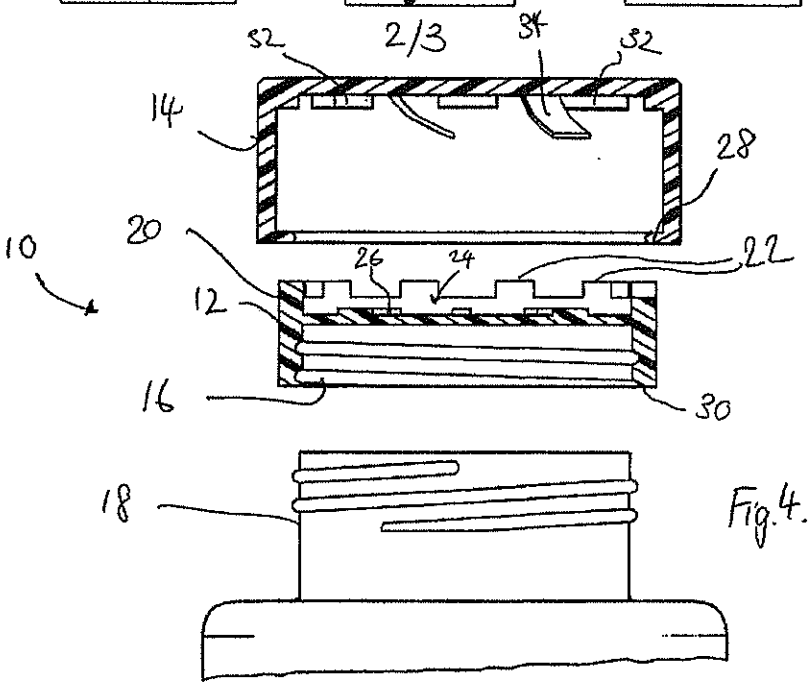


Fig. 4.

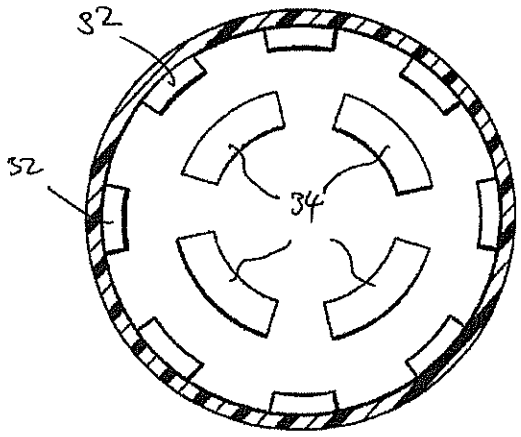


Fig. 5

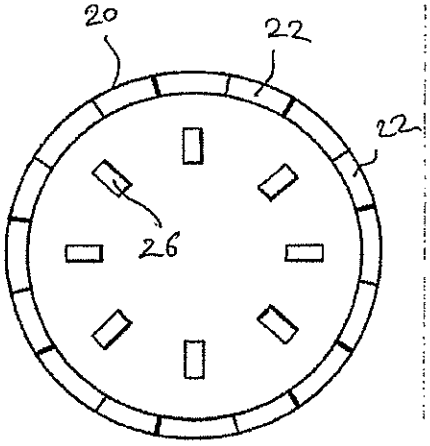
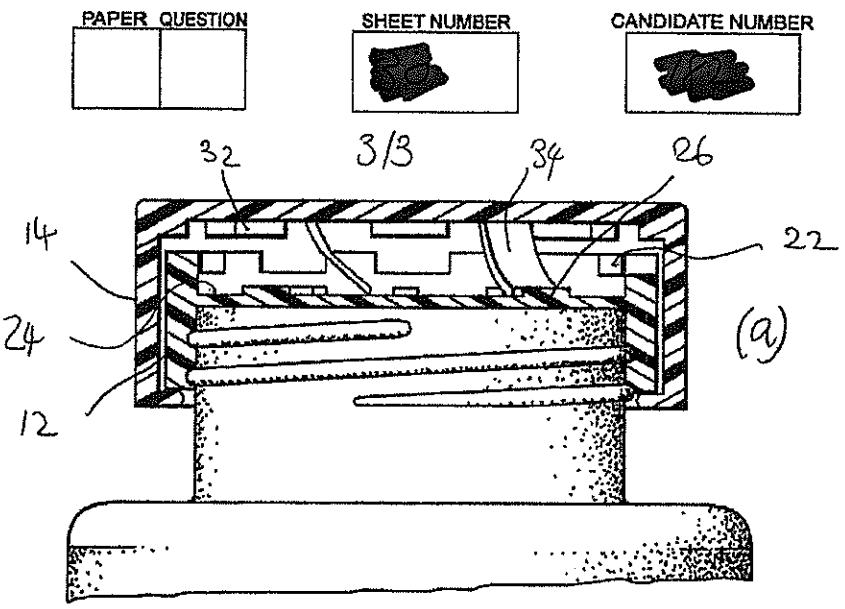


Fig 6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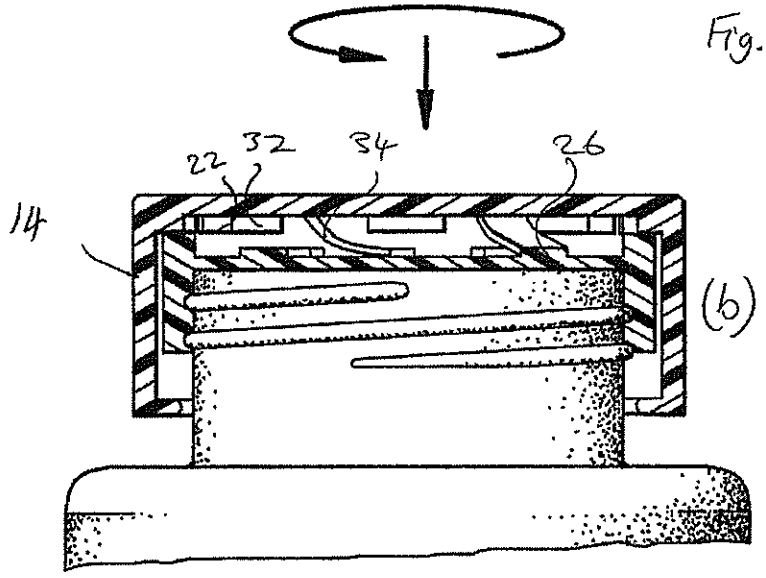
22
32
34
26
14
(b)

Fig. 7