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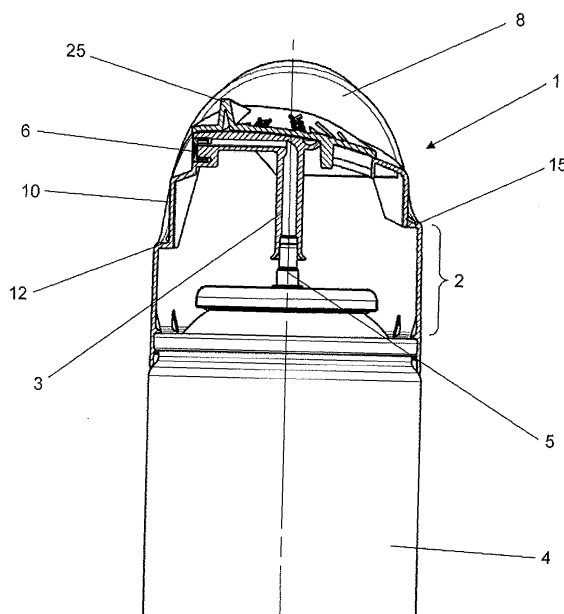
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(54) **Aerosol cap with lock**

(57) The present invention relates to an aerosol cap (1) comprising a base portion (2) and an aerosol actuation portion (10) for interfacing with an aerosol can (4), in particular the fluid exit tubing (5) from the aerosol can (4), wherein the aerosol actuation portion (10) is rotationally held in the aerosol cap (1). The aerosol cap (1) further comprises a slidcable or rotatable locking mechanism (20) having both a locked orientation and an unlocked orientation. The locking mechanism (20) comprises one

or more locking extensions (21) which, when the locking mechanism (20) is in the locked orientation, align with one or more blocking surfaces (11) of the aerosol cap (1) to stop rotation of the aerosol actuation portion (10). Additionally, when the locking mechanism (20) is in the unlocked orientation, the one or more locking extensions do not align with the one or more blocking surfaces (11) of the aerosol cap (1) or align with gaps formed in the one or more blocking surfaces (11) of the aerosol cap (1), thus allowing rotation of the actuation portion (10).

Figure 1



Description

BACKGROUND TO THE INVENTION

[0001] Aerosol cans are common place, and provide a convenient way of storing fluids which are to be subsequently ejected from the canister and often sprayed on a target. Aerosols are well known for storage and delivery of fluids wherein the fluid is desirably not to be brought into contact with other media prior to its intended final destination. For example, aerosols are often used for deodorant and antiperspirant, spray paints and cleaning fluids. An aerosol can contains the fluid under pressure by means of a propellant gas. In order to obtain the fluid from the can, the propellant is allowed to expand and push the desired fluid out of the outflow from the aerosol can. In order to allow the propellant to expand, a valve is opened which is connected to the desired fluid supply, which then allows the fluid to exit the valve by allowing the propellant to expand slightly.

[0002] In order to appropriately direct the fluid exiting the aerosol can, it is typical to provide an aerosol cap which comprises a direction nozzle. Such caps can fit directly onto the valve of the aerosol can and provide an internal channel for the exiting fluid directly to a nozzle. Such designs are extremely simple, but suffer from additional problems relating to accidental discharge. More recently, aerosol caps have been designed such that they cover the entire top of the aerosol can, and then interface with the fluid out pipe and valve by means of a moveable section therein. By attaching the aerosol cap directly to the aerosol can, it is less likely that the aerosol cap will come off and get lost, and it is also possible to provide a more secure and safe connection with the aerosol can.

[0003] The present disclosure relates to an aerosol cap which is intended to interface with the aerosol can, rather than simply the valve and fluid out pipe. In such designs, however, it is still possible for accidental discharge of the aerosol can to occur. This either results from accidentally knocking the part of the aerosol cap directly interfaced with the fluid outflow valve, or, and more seriously, if a young child gets hold of the aerosol can it is possible that the child would accidentally actuate the can, which could lead to significant harm to the child. In order to address this problem, it is desirable to incorporate some form of locking mechanism into the aerosol cap, such that the lock must be disengaged prior to it being possible to actuate the aerosol can.

SUMMARY OF THE INVENTION

[0004] In order to address the above problem, the present disclosure relates to an aerosol cap for an aerosol can which is provided with a locking means or mechanism. The aerosol cap comprises a base portion for connecting the cap to an aerosol can, and an actuation portion, or means, which is structured to interface with the fluid out pipe of the aerosol can. The actuation portion

may be integrally formed with the aerosol cap, or could be a separate portion attachable thereto. The actuation portion is required to move with respect to the aerosol cap, such that the user of the aerosol is able to actuate the aerosol can by applying pressure to the fluid exit pipe or tube from the can. In particular, the actuation means can be rotationally held to, or formed as part of, the aerosol cap.

[0005] The aerosol cap is provided with a locking means, which is slidably or rotatably held, connected or connectable to the aerosol cap. In particular, these locking means have two orientations, one of which is unlocked and allows the motion of the actuation portion or means; the other being locked which stops the motion of the actuation means. The locking means of the aerosol cap are provided with one or more extensions therefrom, such that these extensions can interact with blocking portions to stop motion of the actuation means. In particular, when the locking means are in their locked orientation, the extension will be held on or by the blocking means such that the actuation means cannot be moved. Likewise, when the locking means are in their unlocked orientation, the extensions will be able to pass by the blocking means or surfaces, and thus it will be possible to move the actuation means and operate the aerosol cap.

[0006] It is desirable and possible for the actuation means to be formed as an integral part of the aerosol cap. In this case, the actuation means would also be provided with a fluid channel which would pass from the nozzle of the aerosol cap, to an appropriate position which would then interface with the fluid out pipe of the aerosol can. By putting pressure on the actuation means, pressure would then directly be applied to the valve of the aerosol can, which would consequently release the fluid into the fluid channel and out through the nozzle. In this case, the actuation means would be connected to, or connectable with, the aerosol cap, in particular the base portion thereof, by means of a hinge section allowing rotation of the aerosol actuation means with respect to the base portion.

[0007] Preferably, the locking means can be formed as a separate piece which is connectable with the aerosol cap. Further preferably, the locking means will be snap-fit to the aerosol cap, so as to reduce the chances of its disengagement. Either the locking mechanism can be attached to the base portion of the aerosol cap, or it can be connected with the actuation means. As the locking mechanism is provided with extensions for interacting with the blocking means or portion, when the locking mechanism is attached to the base portion, the blocking means should be formed as part of the actuation means. Likewise, when the locking mechanism is attached to the actuation means, the blocking portion is preferably attached to the base portion of the aerosol cap.

[0008] It is possible for the extensions to extend downward from the locking mechanism, such that they will interact with blocking surfaces or extensions in the relevant other sections. Likewise, the extensions could ex-

tend out to the side of the locking portion, thus allowing the extensions to fit in slots on the relevant other sections. If the extensions extend laterally out from the locking mechanism, it is also possible for these to interact with extensions as the blocking means.

[0009] If the locking mechanism is provided as a second part to the aerosol cap, it may be provided with one or more guiding extensions or ribs on its underside. These guiding ribs are structured such that they will fit within and interact with appropriately sized, shaped and positioned slots or holes in the aerosol cap. Furthermore, it is possible to provide the guiding ribs with lips thereon, such that the lips will form a snap-fit connection through the holes or slots in the aerosol cap.

[0010] In order to provide the user of the aerosol can with an indication of whether the locking mechanism has appropriately engaged the locked or unlocked orientation, a click rib can be provided to interact with the guiding ribs. If this click rib is provided in a position on the cap or actuation portion, such that it overlaps with a section of the guiding hole or slot, it is possible to feel when the locking means are in the open or closed orientation. For example, if the click rib were positioned such that it would not overlap the guiding ribs in both of these two orientations, it is clear that it would need to be bent out of the way in order for the locking mechanism to move from the open to closed configuration. In this case, the user of the aerosol cap would feel the resistance to the movement of the cap, and would have to force against such a click rib. Once the locking means were in the desired open or closed orientation, the user of the can would hear the click rib flicking back to its normal orientation, and also the user would feel the same through the locking mechanism.

[0011] In one preferred embodiment, the locking mechanism is provided as being slidably attached to the aerosol cap. Additionally, the locking portion will always remain within the outer size of the aerosol cap in both the open and closed orientation. That is, the locking portion will not extend outside from the circular cross-section of either the aerosol can or cap in either the open or closed orientations. The same is true for a rotatable locking mechanism.

[0012] It is further possible to provide the aerosol cap with a safety tab. This safety tab is connected between the base portion and the actuation means, and stops any motion of the actuation means until the safety tab is broken. The safety tab is preferably provided by a small section of the aerosol cap which with pressure from the user can be broken, thus allowing the actuation means to move and the aerosol can to be actuated.

[0013] In order to provide a second method of locking the aerosol cap, it is possible to have one or more guiding tabs formed on the base portion. If the locking means are provided by a slidable plate-like button, the side edge portions could be structured to overlap this guiding tab in all but the open orientation of the locking mechanism. This will provide a second mechanism for ensuring the

aerosol cap is appropriately locked, whilst also improving the sliding action of the locking means.

[0014] In order to help the user move the locking means from the locked to unlocked position, it is possible to provide a ridge or extension out of the upper surface. This can be used as a bearing surface for the finger or thumb of the user, and thus allows for the locking means to be moved between the two orientations easily.

[0015] If the locking mechanism is to be attached to the actuation means, it is possible to provide the actuation means with downwardly extending guiding surfaces. These will extend at the same part of the aerosol cap as the blocking means, and will appropriately extend below such. These guiding surfaces will thus allow and improve the movement of the actuation portion past the blocking surfaces. Additionally, the interaction between these guiding surfaces and the blocking means would stop too much sideways motion of the actuation means, thus reducing possible stresses on the hinge portion.

[0016] As a final mechanism for avoiding accidental actuation of the aerosol can, the cap can be provided with sidewall extensions. These sidewall extensions could extend above the upper surface of the actuation portion, and would thus reduce the chances of an accidental knock of the actuation means. By providing the actuation means in the centre of the aerosol cap, two upstanding sidewalls can be provided thus creating a channel in which the actuation means are positioned. These two sidewalls will clearly stop any larger objects landing on top of the aerosol and actuating the actuation means.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Figure 1: Cross-sectional view of an aerosol can and cap according to the present disclosure.

Figure 2: Views from the top and bottom of the aerosol can in the locked and unlocked orientation.

Figure 3: View of the underside of the locking mechanism.

Figure 4: Cut away views of the interaction between the locking means and the blocking surfaces of the aerosol cap.

DETAILED DESCRIPTION

[0018] Figure 1 shows a cross-sectional view of an aerosol can 4 and the aerosol cap 1 of the present disclosure. As can be seen from this figure, the aerosol cap 1 is intended to completely cover the top of the aerosol can 4, so as to reduce the possibility of tampering with the fluid exit tube 5 of the aerosol can 4. Aerosol caps 1 of this type are well known in the art, and the present aerosol

cap 1 is intended to attach to the aerosol can 4 in any of the well known ways for such prior art designs.

[0019] As can be seen from Figure 1, the aerosol cap 1 has a fluid channel 3 which connects from the fluid exit tube 5 of the aerosol can 4. The fluid channel 3 interconnects between the fluid exit tube 5 and a spray nozzle 6 of the aerosol cap 1. It is possible to provide the fluid channel 3 as an integral part of the aerosol cap 1, thus reducing the number of parts required for production of the aerosol cap 1. Obviously, it is also possible to provide a separate fluid channel 3 for interfacing between an aerosol can 4 and the spray nozzle 6.

In order to actuate the aerosol can 4, it is necessary to provide a downward force onto the fluid exit tube 5. This is achieved by providing the aerosol cap 1 with an aerosol actuation portion 10. This actuation portion 10 is designed to interface with the fluid channel 3, such that a user of the aerosol can 4 can push down on the aerosol actuation portion 10 with this force being transmitted via the fluid channel 3 to the fluid exit tube 5. The simplest mechanism for achieving this, is to have the aerosol actuation portion 10 positioned above the fluid channel 3, thereby allowing direct pressure from the user to be passed to the fluid exit tube 5.

[0020] In designs where the fluid channel 3 is an integral part of the aerosol cap 1, the aerosol actuation portion 10 can in fact also comprise the fluid channel 3, such that when the user acts on the aerosol actuation portion 10, this also moves the fluid channel 3 thus actuating the aerosol can 4. It is further possible to form the aerosol actuation portion 10 in such a way that it further comprises the spray nozzle 6. In such a design, the aerosol actuation portion 10 comprises the fluid channel 3 as well as the spray nozzle 6, and this combination of features is connected in a moveable manner to a base portion 2 of the aerosol cap 1.

[0021] Connection of this combination of features, which shall be described hereinafter as simply the aerosol actuation portion or actuation portion, to the base portion 2 is most easily achieved by means of a linking hinge 12. Preferably the linking hinge 12 is also an integral part of the aerosol cap 1, and is merely a section of material of the aerosol cap which connects between the base portion 2 and the aerosol actuation portion 10. In particular, the linking hinge 12 can be a thin strip of the material formed in the aerosol cap 1, which will then allow rotation and relative motion between the aerosol cap 1 and the aerosol actuation portion 10. It is expected that the aerosol cap 1 will be fabricated from some form of plastic, as this material can readily be injection moulded and provides a light solution to the provision of an aerosol cap 1. Obviously, should the aerosol cap 1 be formed of a metallic material, the thin joining piece making the linking hinge 12 will also allow relative motion between the base portion 2 and the aerosol actuation portion 10.

[0022] Looking at Figure 2a and 2b, we see top and bottom views of the aerosol cap 1. In particular, the locking mechanism 20 of the aerosol can 4, can be seen and

understood; wherein Figure 2a shows the locking mechanism in the locked position, and in Figure 2b the locking mechanism is in the unlocked position. Obviously, the locking mechanism 20 is intended to block actuation of the aerosol can 4 by stopping the aerosol actuation portion 10 from being moved relative to the aerosol can 4. The technique of locking the aerosol actuation portion 10 is by provision of a moveable locking mechanism 20 attached either to the aerosol actuation portion 10, or the base portion 2 of the aerosol cap 1. The locking mechanism 20 is provided with locking extensions 21 which will interact with blocking surfaces 11, or relevant indents, on either the aerosol actuation portion 10 or the base portion 2. If the locking mechanism 20 is attachable or attached to the aerosol actuation portion 10, the locking extensions 21 will interact with blocking surfaces 11 formed on the base portion 2. Likewise, if the locking mechanism 20 is connected or connectable to the base portion 2, the locking extensions 21 of the locking mechanism 20 will interact with blocking surfaces 11 formed on the aerosol actuation portion 10.

[0023] In the figures, the option in which the locking mechanism 20 is attached or attachable to the aerosol actuation portion 10 is shown. In particular, the locking mechanism 20 is structured as a sheet-like button member which slidably engages with the aerosol actuation portion 10. That is, the locking mechanism 20 has an extended shape which is approximately the same size as the finger of the user, as well as being approximately the same width as the aerosol actuation portion 10 in a preferred embodiment, such that the user of the aerosol can 4 will be able to move the locking mechanism 20 and use this to provide the force directly to the aerosol actuation portion 10. The slidable option for the locking mechanism 20 is one of a variety of options, with the aspect of the disclosure relating to the interaction of the locking extensions 21 with the blocking surfaces 11. For example, the locking mechanism 20 could be a rotatable member, wherein the locking extensions 21 interact and overlap with blocking surfaces 11 in one rotational position, and after rotation of the locking mechanism 20 the locking extensions 21 no longer overlap with the blocking surfaces 11, thus allowing actuation of the aerosol actuation portion 10.

As is also clear from the figures, the locking mechanism 20 interacts with and is connected/connectable to the aerosol actuation portion 10. In an alternative embodiment, the locking mechanism 20 could be positioned at one side, or both sides, of the aerosol actuation portion 10, wherein the user of the aerosol can 4 would again have to move the locking mechanism 20 such that the locking extensions 21 did not overlap with the blocking surfaces 11. It would also be possible to provide the blocking surfaces 11 as elongate structures, in which a small gap were provided. By providing a small gap in the locking surfaces 11, the locking extensions 21 of the locking mechanism would only be able to pass through this gap in one precise orientation. By further structuring the

locking extensions 21 and blocking surfaces 11 in this way, the security and safety of the aerosol cap 1 can be further improved. That is, as only one exact orientation between locking extensions 21 and blocking surfaces 11 will allow actuation of the aerosol can 4, the possibility of accidental alignment and actuation is reduced.

[0024] In the figures and above discussion, it is clear that the design relates to the provision of two locking extensions 21 and two blocking surfaces. This is by way of example only, and of course any number of locking extensions 21 and blocking surfaces 11 is conceivable. For example, the locking mechanism 20 could be provided with only one locking extension 21 which interacted with a single blocking surface 11. Likewise, four locking extensions 21, two positioned either side of the locking mechanism 20, could interact with appropriately shaped and structured blocking surfaces 11. Additionally, as can be seen in Figures 3 and 4, the locking extensions 21 are shown as extending downward from the lower surface of the locking mechanism 20. These downwardly extending locking extensions 21 interact and rest on the upper surface of the blocking surfaces 11 which are attached to the base portion 2. Again, it is possible that the locking extensions 21 could extend sideways out of the sides 24 of the locking mechanism 20. The key aspect being, that the locking extensions 21 will interact with the blocking surfaces 11 to allow actuation of the aerosol can 4 in one orientation, and blocking actuation in all others. This is achieved by stopping, or allowing, the movement of the aerosol actuation portion 10.

[0025] Looking at Figure 3, the locking mechanism 20 is viewed from the bottom. As has been discussed above, this design of the locking mechanism 20 comprises locking extensions 21 which extend in a generally downward direction. Additionally, the locking mechanism 20 is provided with guiding ribs 22, such that the motion of the locking mechanism 20 in the aerosol cap 1 can be appropriately controlled. As will be appreciated from the figures, in this shown example the locking mechanism 20 is slidably engaged with the aerosol actuation portion 10. In order to allow this slidable engagement, the aerosol actuation portion is further provided with guiding holes or slots 13. The guiding holes or slots 13 are appropriately sized to receive the guiding ribs 22, thus allowing the slidable motion between the locking mechanism 20 and aerosol actuation portion 10.

[0026] Obviously, if the locking mechanism 20 is attached to the base portion 2, the structure of the guiding ribs 22 and holes in the base portion 2 are appropriately similar. That is, the holes or slots, if provided in the base portion 2, will allow the relative motion of the locking mechanism 20 so as to allow motion between the open and closed orientation. Further, if the locking mechanism 20 is rotatably attached or attachable to the aerosol cap 1, either the aerosol actuation portion 10 or base portion 2, the guiding ribs 22 could be formed with a radial shape such that they will allow appropriate rotation of the locking mechanism 20. Likewise, the holes or slots 13 provided

in the aerosol actuation portion 10 or base portion 2 will also have this radial shape.

[0027] It is preferable for the locking mechanism 20 to be connectable or connected with the aerosol cap 1 in a snap-fit manner. The simplest mechanism of providing the snap-fit connection is to provide the guiding ribs 22 with appropriate lips 23 thereon. The lips 23 on the guiding ribs 22 will thus lead to some slight deformation of the guiding ribs 22 when the locking mechanism 20 is connected with the aerosol actuation portion 10 or base portion 2. That is, the guiding ribs 22 will need to be bent so as to allow the lips 23 to pass through the appropriate guiding holes or slots 13. Once the lips 23 have passed through the guiding holes or slots 13, the guiding ribs 22 will return to their normal configuration, thus holding the locking mechanism 20 to either the aerosol actuation portion 10 or base portion 2.

[0028] Figure 4 shows a possible interaction between the locking extensions 21 of the locking mechanism 20 and the blocking surfaces 11. As will be seen in this Figure, the blocking surfaces 11 are provided on the base portion 2, and it is conceived that the locking mechanism 20 would be slidably connected and connectable with the aerosol actuation portion 10. As can be seen in the figure, in one orientation the locking extension 21 is positioned on top of blocking surface 11, and thus the locking mechanism 20 and actuation portion 10 cannot be moved downward. By stopping the downward motion of the locking mechanism 20 in this way, the user of the aerosol cannot put force on the aerosol actuation portion 10, and the actuation of the aerosol can 4 is stopped. Additionally, as the actuation portion 10 is connected to the locking mechanism 20, it also cannot be moved as the locked locking mechanism 20 stops this. This advantageously stops the actuation portion 10 from being directly moved and thus actuation of the aerosol can 4 is stopped. As can also be seen in this figure, the blocking surfaces 11 could be provided with a downward facing rear portion, such that if the locking mechanism 20 is not fully moved to the unlocked position, downward motion of the locking mechanism 20 would lead to the locking extensions 21 hitting this downward sloped blocking surface 11. This would lead to the interaction between the locking extensions 21 and blocking surfaces 11 generally moving the locking mechanism 20 into the opened orientation, which could improve the ease of actuation of the aerosol can 4. As will be clear from the figures, the front portion of the blocking surfaces 11 are formed flat, such that no aid in shifting the locking mechanism 20 with downward force into the unlocked position would occur.

[0029] As can also be seen in one of the images in Figure 4, it is additionally possible to provide the base portion 2 with a guiding tab 7. This guiding tab 7 helps to guide the slidable motion of the locking mechanism 20, thus improving the operation of the aerosol cap 1. This guiding tab 7 can also be used as a secondary locking aid, as it would interact with the outer side edges 24 of the locking mechanism 20 in all but the unlocked ori-

entation. This would further improve the locking characteristics of the aerosol cap 1.

[0030] As can further be seen in the under views from the aerosol cap 1 shown in Figures 2a and 2b, the aerosol actuation portion 10 could be provided with additional guiding surfaces 16. These guiding surfaces 16 could extend generally downward in the direction toward the aerosol can 4. Further, they would be located at the same position as the blocking surfaces 11 formed on the base portion 2. The purpose of the guiding surfaces 16 would be to ensure that any sideways motion of the aerosol actuation portion 10 is reduced, thus leading to a smoother and more reliable rotational motion of the actuation portion 10 around the linking hinge 12. Further, these guiding surfaces 16 would tend to reduce any unwanted twisting rotation around the linking hinge 12, thus improving the lifetime of this hinge 12.

[0031] Another aspect of the aerosol actuation portion 10 which can be seen from Figures 2a and 2b, in particular the under views therein, is the provision of a click rib 14. Whilst only one click rib 14 is shown, this by way of example, and the skilled person will appreciate that multiple click ribs 14 or no click ribs 14 could also be provided. As can be seen from Figures 2a and 2b, the click rib 14 is located such that it overlaps a portion of the guiding hole or slot 13. The click rib 14 will interact with appropriate guiding ribs 22 of the locking mechanism 20, and is useable to ensure that the user appreciates when the locking mechanism 20 is appropriately locked or unlocked. That is, the click rib 14 is positioned such that it must be bent out of the way when the locking mechanism 20 is moved from the unlocked to the locked orientation, and once the locking mechanism is in the appropriate orientation, the click rib 14 is no longer bent out of the way by the locking extension 21.

[0032] Whilst the option shown is for a slidable locking mechanism 20, the principle is equally applicable to a rotational locking mechanism 20. Primarily, the guiding holes or slots 13 can be approximately twice the size of the locking extensions 21, and thus also define the full motion of the locking mechanism 20. In going from the locked orientation to the unlocked orientation, the locking extension 21 must push the click rib 14 out of the way, so as to allow the slidable or rotational motion. Once the locking mechanism 20 is in the other locked or unlocked orientation, the click rib 14 is no longer held by the locking extension 21, and clicks back to its straight orientation as shown in the figures. This gives both an audible and tactile hint to the user of the aerosol cap 1 that the locking mechanism 20 is in the appropriate orientation. Additionally, the click rib 14 will tend to stop unwanted motion of the locking mechanism 20 between one or other of the locked or unlocked orientations, thus ensuring that accidental actuation of the aerosol can 4 does not occur.

[0033] As can be seen in Figure 2a, and in particular in the upper view thereof, the aerosol cap 1 can be provided with a safety tab 15. This safety tab 15 stops the motion of the aerosol actuation portion 10 until it is

snapped or broken. The provision of the safety tab 15 shows to the purchaser of the aerosol can 4 that the aerosol can 4 has not yet been discharged, and thus the user can be confident that the aerosol can 4 is completely full. Additionally, the provision of the safety tab 15 avoids the aerosol can 4 from being accidentally discharged until the aerosol can 4 is ready for its first use by the user. By applying an appropriately large force to the aerosol actuation portion 10, the safety tab 15 will be broken, and the aerosol can 4 can be appropriately used.

[0034] One other aspect of the aerosol cap 1, is the possible provision of the extended sidewall portions 8. As can be seen from the design in the figures, the sidewall portions 8 may extend upward above the aerosol actuation portion 10. The advantage of having these higher sidewall portions 8 is that this reduces significantly the chances of accidental knocks on the aerosol actuation portion 10. That is, most objects which would land on the aerosol actuation portion 10 are generally stopped by the sidewall portion 8, thus such knocks are avoided and the aerosol actuation portion 10 and locking mechanism 20, when attached thereto, are generally protected. The preferred design shown in the figures, is that the locking mechanism 20 is slidable attached to the aerosol actuation portion 10, and that two extended sidewall portions 8 are provided at either side of this. These extend above the height of the locking mechanism 20, thus reducing the chance of stray impacts damaging the aerosol actuation portion 10 and locking mechanism 20. Obviously, the gap between the sidewall portions 8 is preferably wider than the finger of the user.

[0035] Another advantage of the design for the aerosol cap 1 is that the locking mechanism 20 can be designed to never extend outside the footprint the aerosol cap 1. That is, in either orientation, that of locked or unlocked, the locking mechanism 20 is held within the aerosol cap 1, which is provided with a footprint which has the same diameter as the aerosol can 4. Clearly, it is advantageous for the locking mechanism 20 to not extend beyond the outer surface of the base portion 2 of the aerosol cap 1, as this leads to a safer and better design less likely to suffer from unwanted damage.

[0036] As can further be seen in Figures 1 and 2, the locking mechanism 20 may be provided with a finger extension 25. Such an extension 24 provides an appropriate surface upon which the finger of the user can act in order to move the locking mechanism 20 between the locked and unlocked orientation. This finger extension 25 can be provided at any point on the locking mechanism 20, and provides a useful surface upon which the finger can act.

[0037] Whilst the above description has been presented with a variety of features, it is not intended that any specific combination of features should be considered as preferable or appropriately disclosed. That is, the above description should be read in a non-limiting manner, and any alleged combination of features which appear to be necessarily linked, should not be read in such

a regard. That is, the features of the aerosol cap 1 as above described should be each considered as optional, so that any combination of aspects to the above design could be taken, and none are considered as explicitly required or disclosed.

- 1 Aerosol Cap
- 2 Base Portion
- 3 Fluid Channel
- 4 Aerosol Can
- 5 Fluid Exit Tubing
- 6 Spray Nozzle
- 7 Guiding Tabs
- 8 Sidewall Portions
- 10 Aerosol Actuation Portion
- 11 Blocking Surfaces
- 12 Linking Hinge
- 13 Guiding Holes or Slots
- 14 Click Rib
- 15 Safety Tab
- 16 Guiding Surfaces
- 20 Locking Mechanism
- 21 Locking Extensions
- 22 Guiding Ribs
- 23 Lips on Guiding Ribs
- 24 Outer Side Edges of Locking Mechanism
- 25 Finger Extension

Claims

1. An aerosol cap (1) comprising a base portion (2) and an aerosol actuation portion (10) for interfacing with an aerosol can (4), in particular the fluid exit tubing (5) from the aerosol can (4), wherein the aerosol actuation portion (10) is rotationally held in the aerosol cap (1); wherein the aerosol cap (1) further comprises a slideable or rotatable locking mechanism (20) having a locked orientation and an unlocked orientation, the locking mechanism (20) comprising one or more locking extensions (21) which, when the locking mechanism (20) is in the locked orientation, align with one or more blocking surfaces (11) of the aerosol cap (1) to stop rotation of the aerosol actuation portion (10); and when the locking mechanism (20) is in the unlocked orientation, the one or more locking extensions (21) do not align with the one or more blocking surfaces (11) of the aerosol cap (1) or align with gaps formed in the one or more blocking surfaces (11) of the aerosol cap (1), thus allowing rotation of the actuation portion (10).
2. The aerosol cap (1) according to claim 1, wherein the actuation portion (10) is an integral part of the aerosol cap (1) and has means, in particular in the form of a fluid channel (3), for interfacing directly with

the fluid exit tube (5) of the aerosol can (4) and providing the fluid to a spray nozzle (6) of the aerosol cap (1), the actuation portion (10) being formed in connection with the base (2) of the aerosol cap (1) by means of a linking hinge (12), which is preferably a section of the aerosol cap (1) which is small enough to allow the relative motion of the actuation portion (10) by means of it bending.

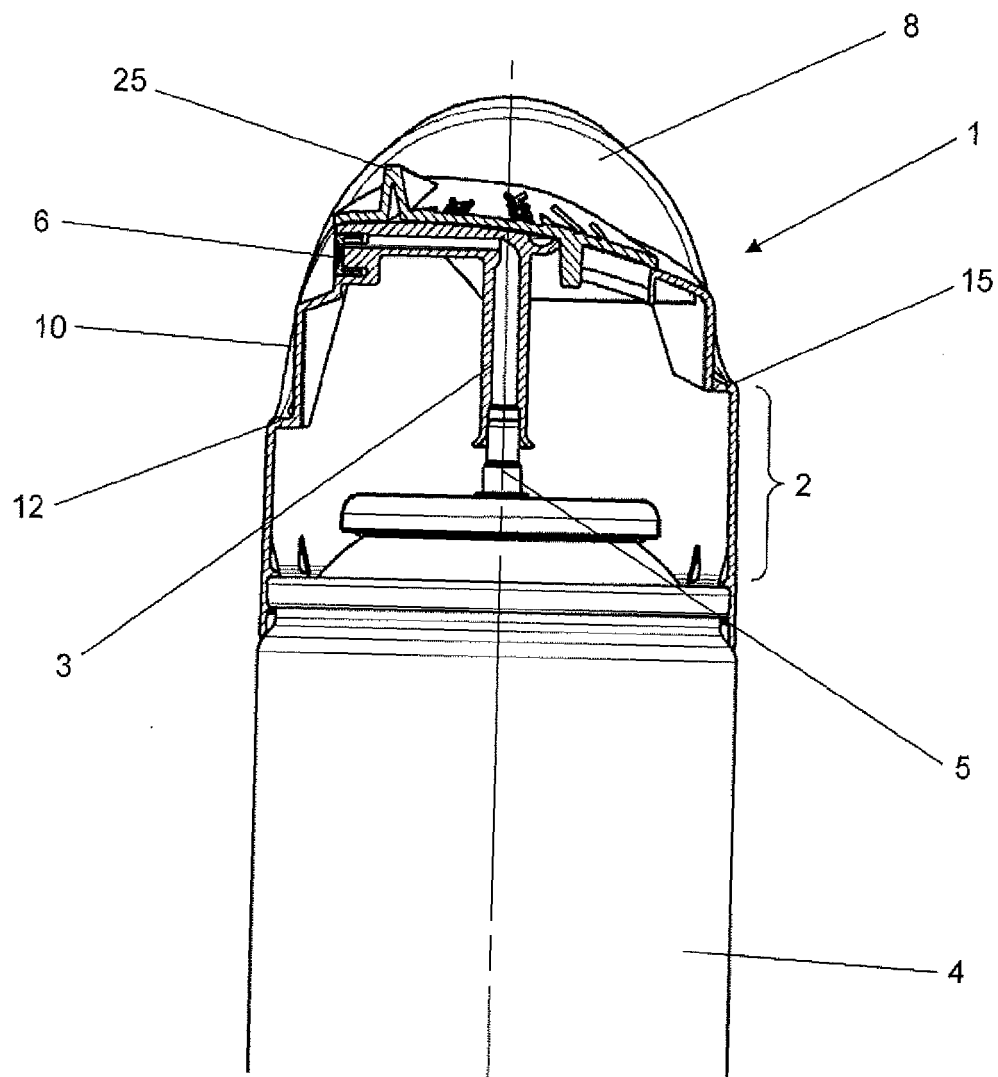
3. The aerosol cap (1) according to either one of claims 1 or 2, wherein the locking mechanism (20) is formed from a separate piece which is clip-fit with the base (2) or actuation portion (10) of the aerosol cap (1), such that: when the locking mechanism (20) is connectable with the base (2), the one or more blocking surfaces (11) are formed on the actuation portion (10); and when the locking mechanism (20) is connectable with the actuation portion (10), the one or more blocking surfaces (11) are formed on the base (2).
4. The aerosol cap (1) according to any one of the previous claims, wherein the locking extensions (21) project either downward toward the aerosol can (4) from either side of the locking mechanism (20) or they project outward, perpendicular to the central axis of the aerosol can (4), from either side of the locking mechanism (20).
5. The aerosol cap (1) according to any one of the previous claims, wherein the locking mechanism (20) has one or more guiding ribs (22) on the underside thereof, wherein the one or more guiding ribs (22) are sized, shaped and positioned to fit within appropriate guiding holes or slots (13) in the aerosol cap (1), wherein the guiding ribs (22) are formed with appropriate lips so as to provide a snap fit connection with the aerosol cap (1).
6. The aerosol cap (1) according to any one of the previous claims, wherein one or more of the holes or slots (13) in the aerosol cap (1) is provided with a flexible click rib (14), wherein the click ribs (14) are positioned to overlap the paths of one or more of the guiding ribs (22), and are further located such that when the locking mechanism (20) is in the fully open and/or fully closed orientation, each click rib (14) is not in contact with the associated guiding rib (22), thus holding the locking mechanism (20) in the current orientation.
7. The aerosol cap (1) according to any one of the previous claims, wherein the locking mechanism (20) is connected or connectable in a slideable manner with the actuation portion (10) and has one or more guiding ribs (22) on the underside thereof, wherein the one or more guiding ribs (22) are sized, shaped and

positioned to fit within appropriate guiding holes or slots (13) in the actuation portion (10), wherein the guiding ribs (22) are formed with appropriate lips (23) so as to provide a snap fit connection with the actuation portion (10).

8. The aerosol cap (1) according to any one of the previous claims, wherein the locking mechanism (20) is connected or connectable in a slideable manner to the aerosol cap (1), and in the open and closed orientations, and positions therebetween, does not extend out of the sides of the aerosol cap (1), and remains fully within the outer diameter formed by the aerosol cap (1) and can (4).
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9. The aerosol cap (1) according to any one of the previous claims, wherein the actuation portion (10) is connected to the base (2) by means of a small section of the aerosol cap (1) to allow for relative rotation between the two, and is also connected to the cap (1) by means of safety tab (15) which is at the back of the actuation portion (10) and stops the actuation portion (10) from rotating, wherein the safety tab (15) is sized so that it may be broken with the first use of the aerosol with extra force provided by the user.
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10. The aerosol cap (1) according to any one of the previous claims, wherein the locking mechanism (20) is connected or connectable in a slideable manner with the actuation portion (10) and has an extended form which preferably covers the width of the actuation portion (10); and
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the aerosol cap (1) preferably has guiding tabs (7) formed such that they will be positioned under the outer side edges (24) of the locking mechanism (20) in all but the open orientation, thus providing further locking and sliding support.
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11. The aerosol cap (1) according to any one of the previous claims, wherein the locking mechanism (20) comprises a finger extension (25), which is located toward one end of the locking mechanism (20), and extends out of the upper surface of the locking mechanism (20), and is for providing a bearing surface for the finger of a user to allow easier sliding of the locking mechanism (20).
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12. The aerosol cap (1) according to any one of the previous claims, wherein the actuation portion (10) is further provided with one or more downwardly extending guiding surfaces (16) which are located such that they align with, but do not overlap with, and extend past the one or more blocking surfaces (11) of the base (2), so that they will reduce sideways motion of the actuation portion (10) by striking the blocking surfaces (11) if sideways motion occurs, thus improving the guidance of the actuation portion (10).
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13. The aerosol cap (1) according to any one of the previous claims, wherein actuation portion (10) is formed within the middle of the aerosol cap (1) and either side are formed sidewall portions (8) which extend in the direction away from the aerosol can (4) to a point higher than the actuation portion (10), so as to reduce the chances of accidental actuation of the aerosol as a result of an object striking the aerosol cap (1) from above.

Figure 1



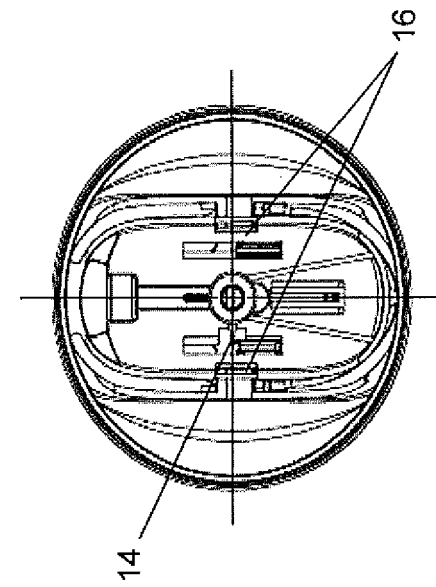
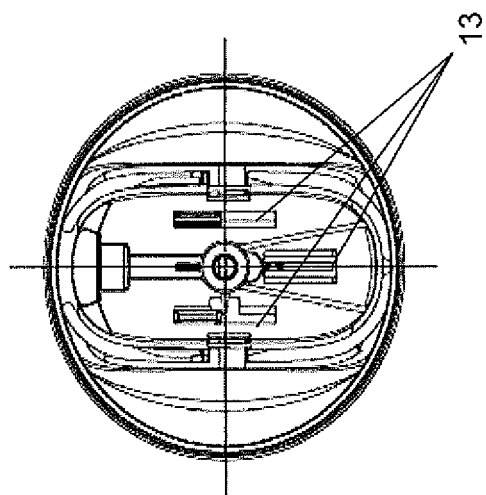
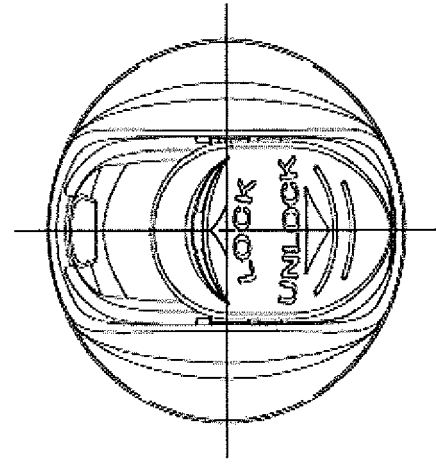
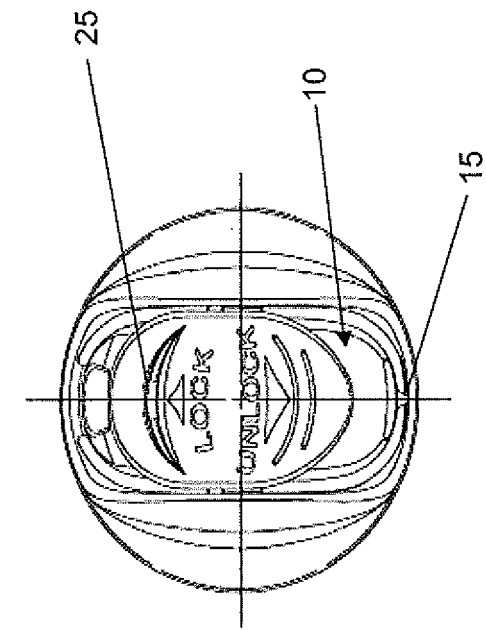


Figure 2a

Figure 2b

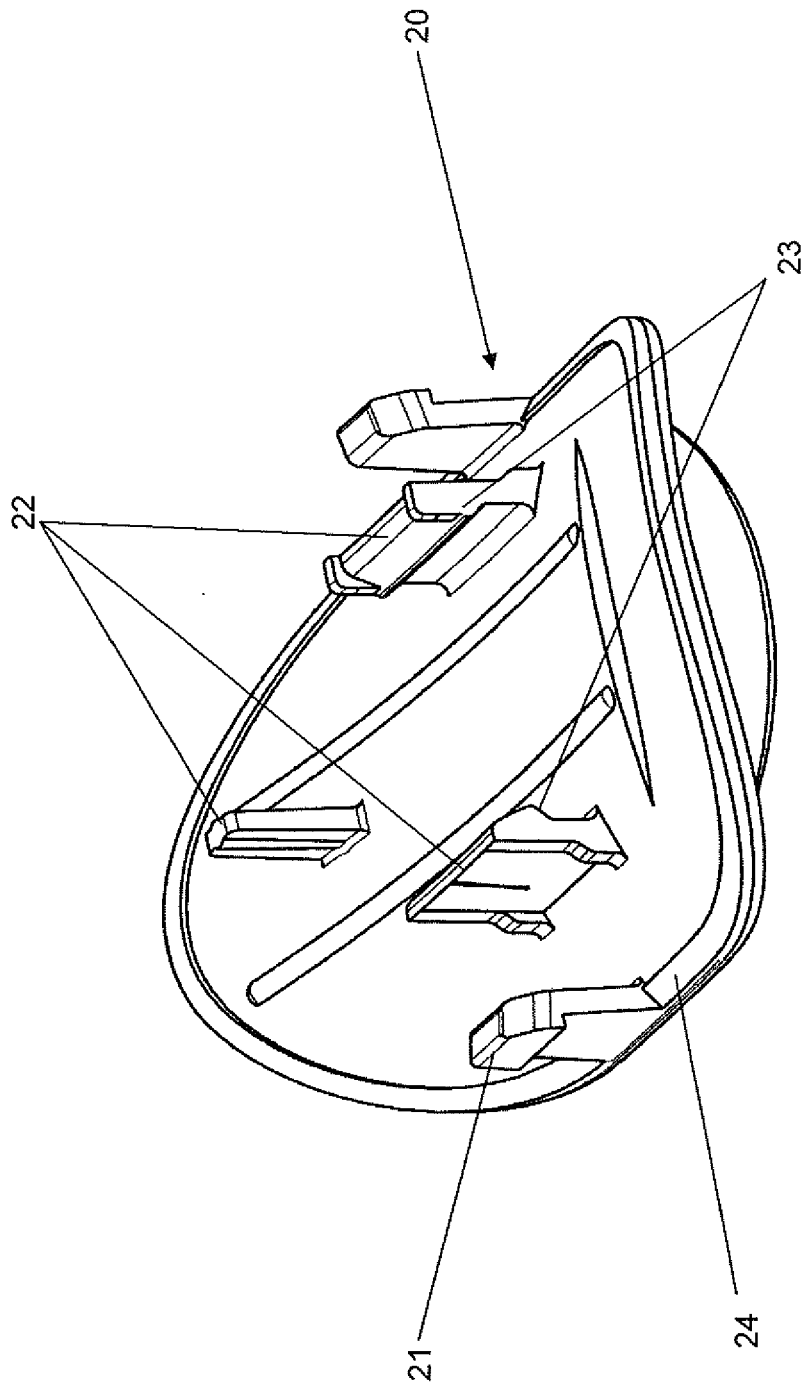
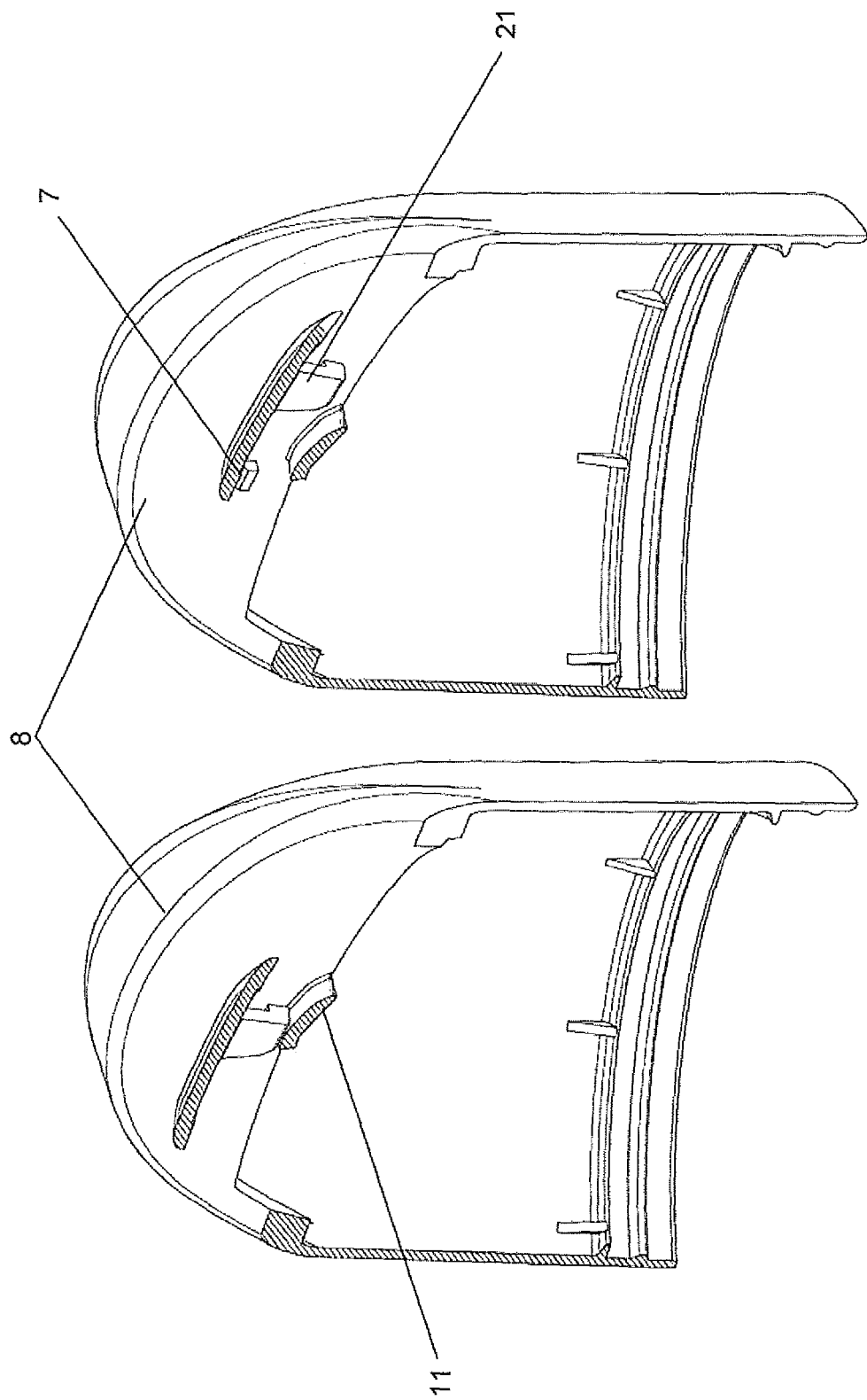


Figure 3

Figure 4





EUROPEAN SEARCH REPORT

Application Number
EP 09 15 5090

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 September 2009	Examiner Endrizzi, Silvio
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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