

(43) **Pub. Date:** **Apr. 20, 2017**

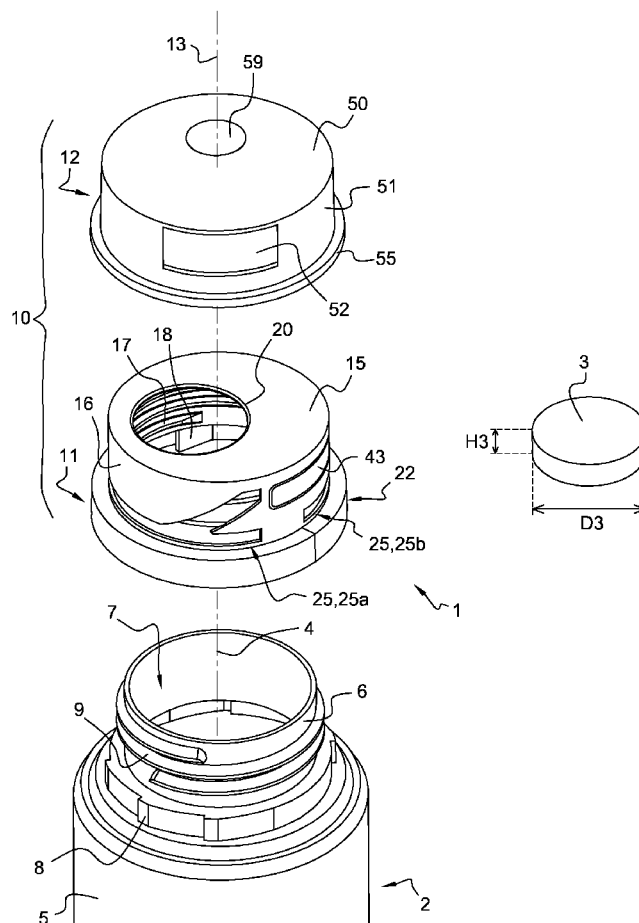
Publication Classification

(52) **U.S. CI.**
CPC *B65D 83/0409* (2013.01); *B65D 51/24*
(2013.01); *B65D 83/049* (2013.01); *B65D*
2215/04 (2013.01)

Mar. 26, 2014	(FR)	14/52576
Jun. 24, 2014	(FR)	14/55843

(57)

A device for delivering a pellet, the device having: a base intended to be assembled to a neck of a recipient, including a skirt and a transverse wall presenting an orifice; a cap mounted coaxially on and around the base, including a transverse wall and a skirt presenting an aperture and wherein protrusions formed on the cap are displaced in grooves formed on the base so that the cap can be displaced between: a closed position, in which the transverse faces of the base and of the cap are adjacent, the orifice and the aperture being closed; and an open position, where, between the base and the cap, is created an intermediate chamber in which a pellet contained in the recipient can enter via the orifice of the base, and then come out via the aperture of the cap.



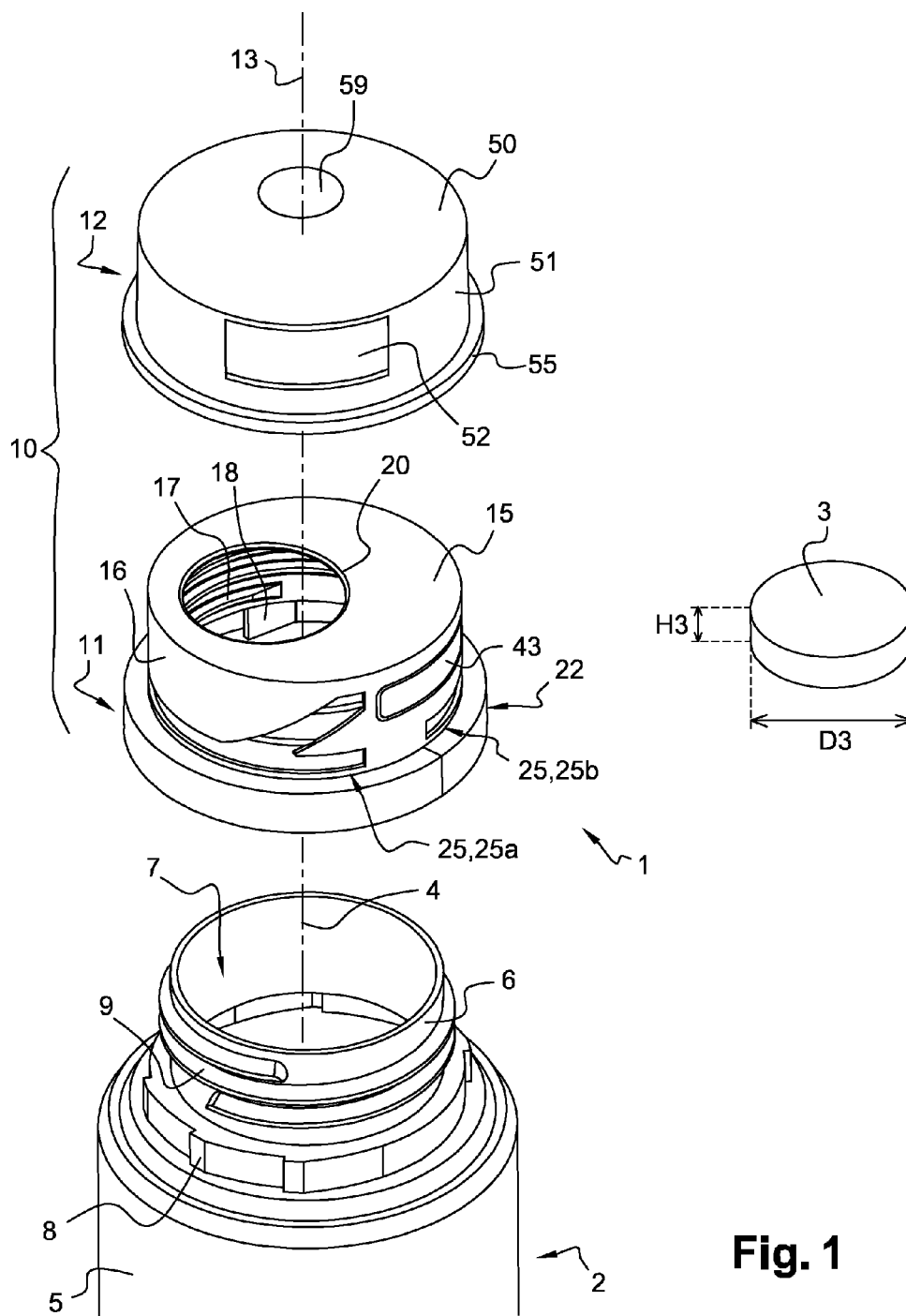


Fig. 1

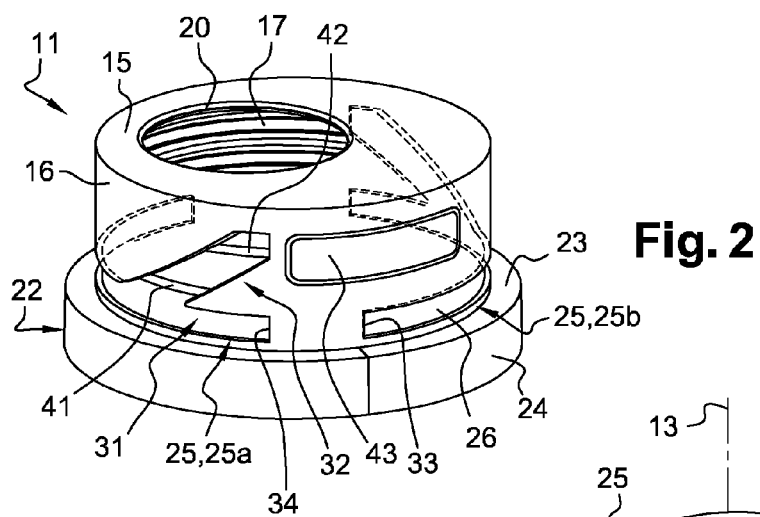
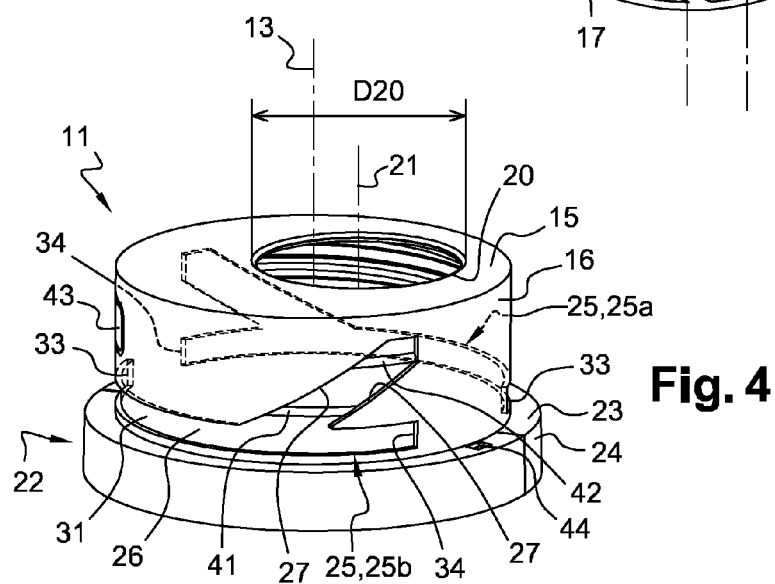
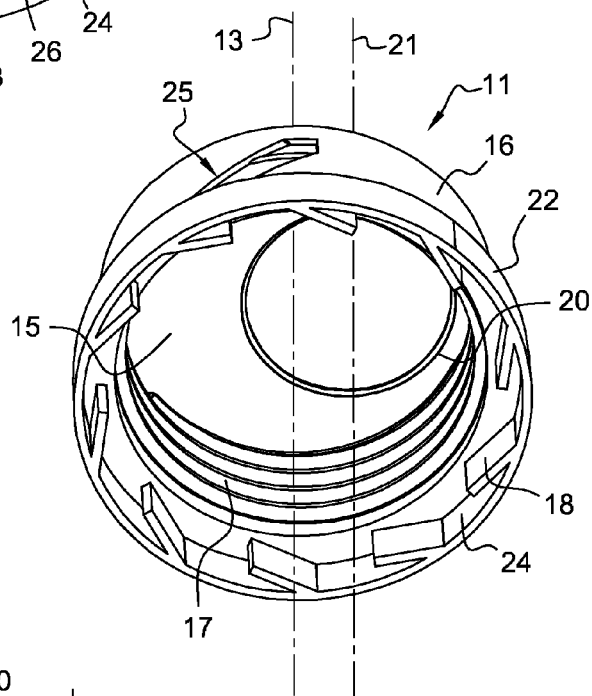
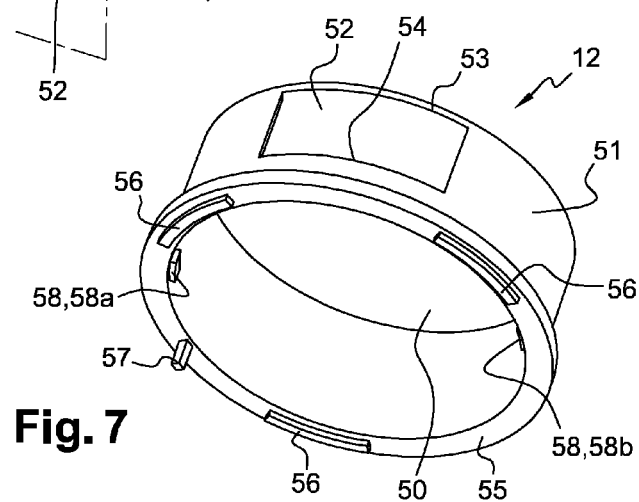
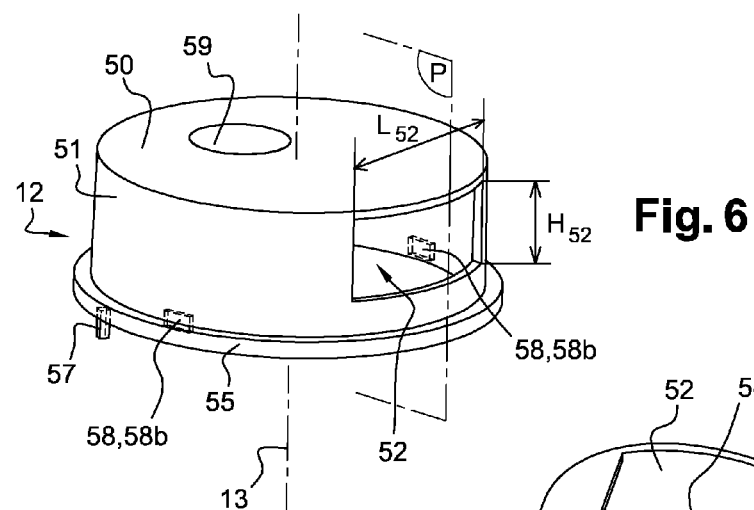
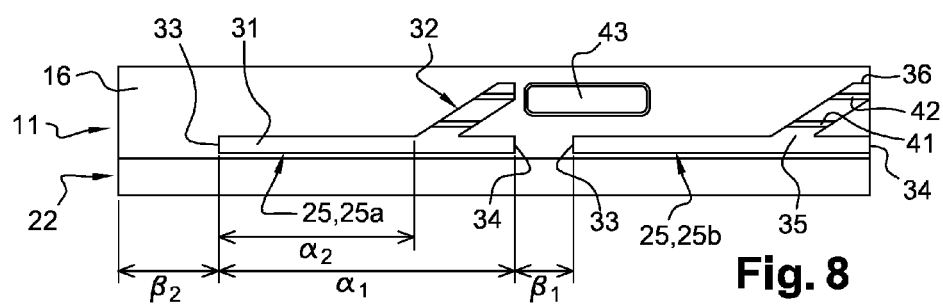
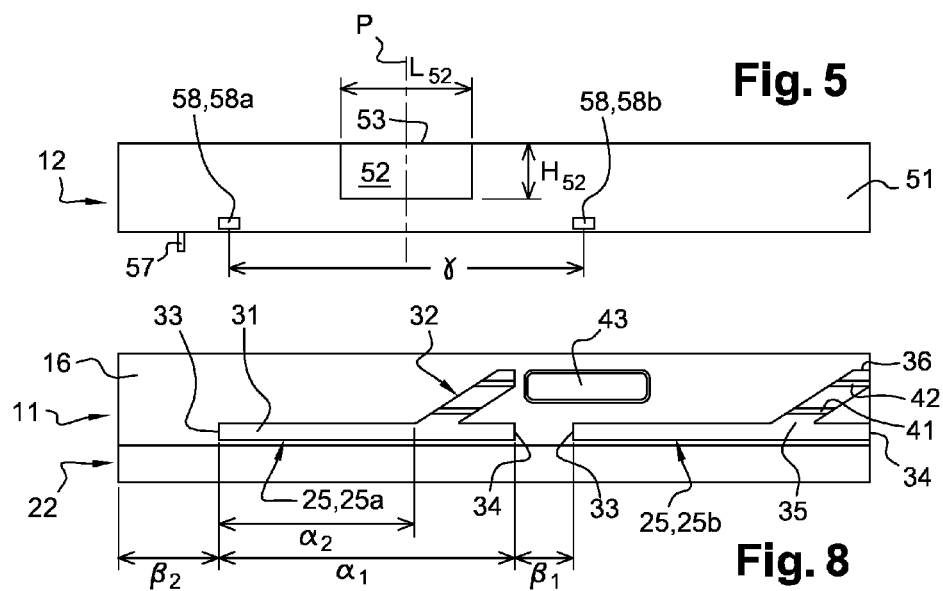


Fig. 3





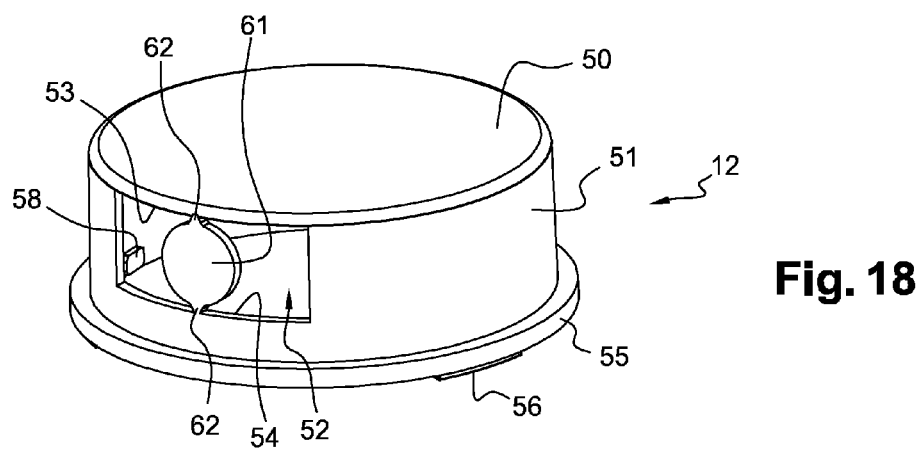
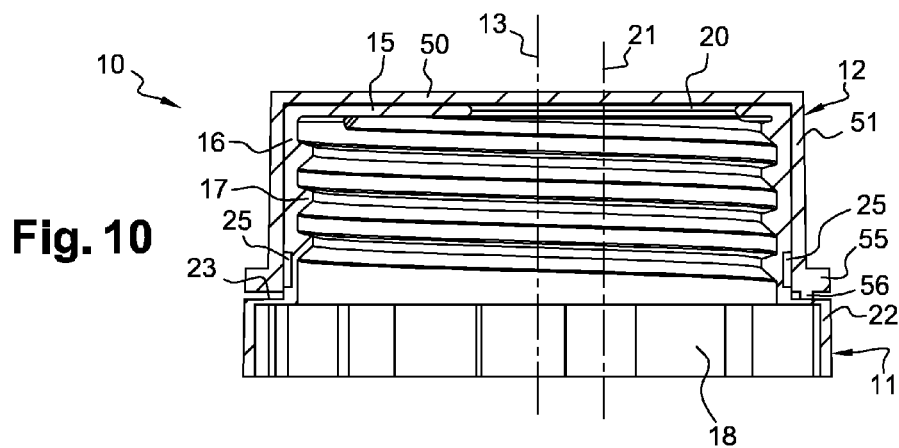
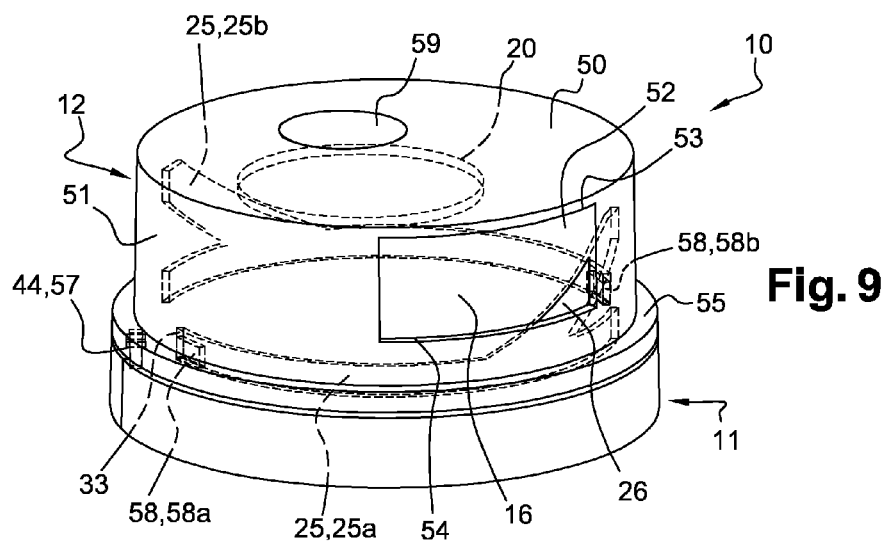


Fig. 11

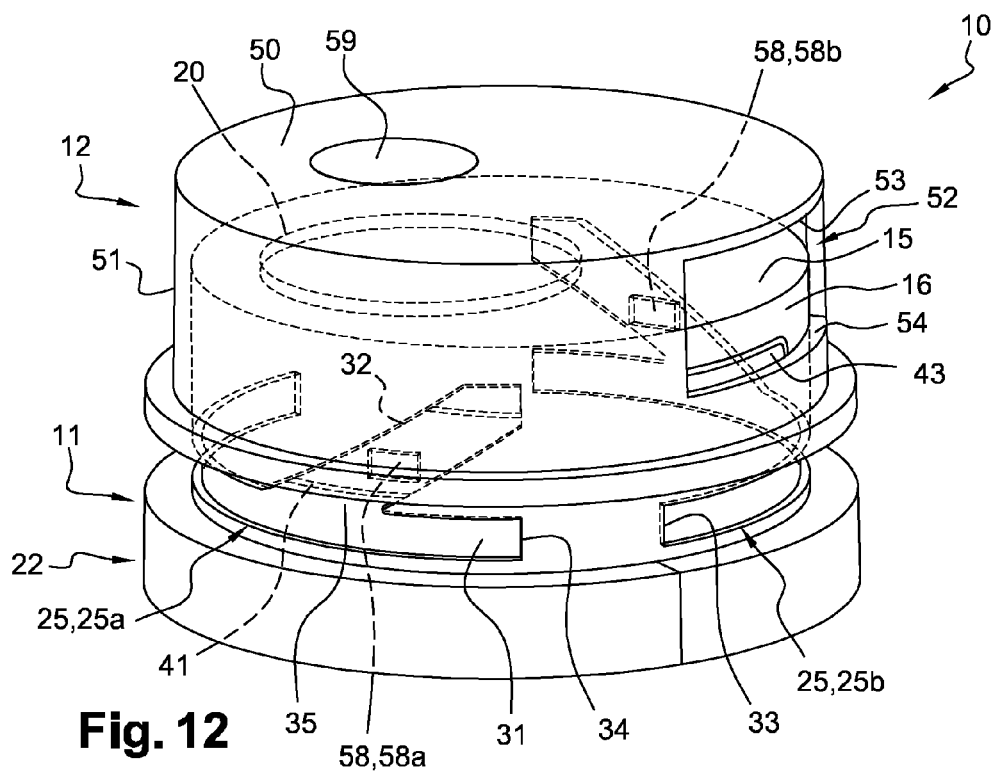
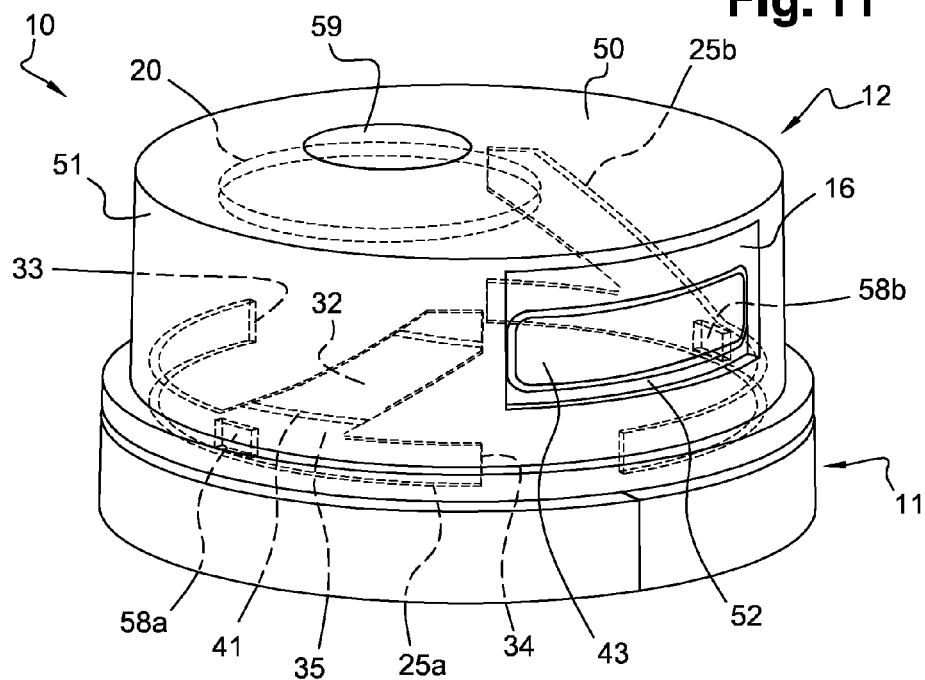
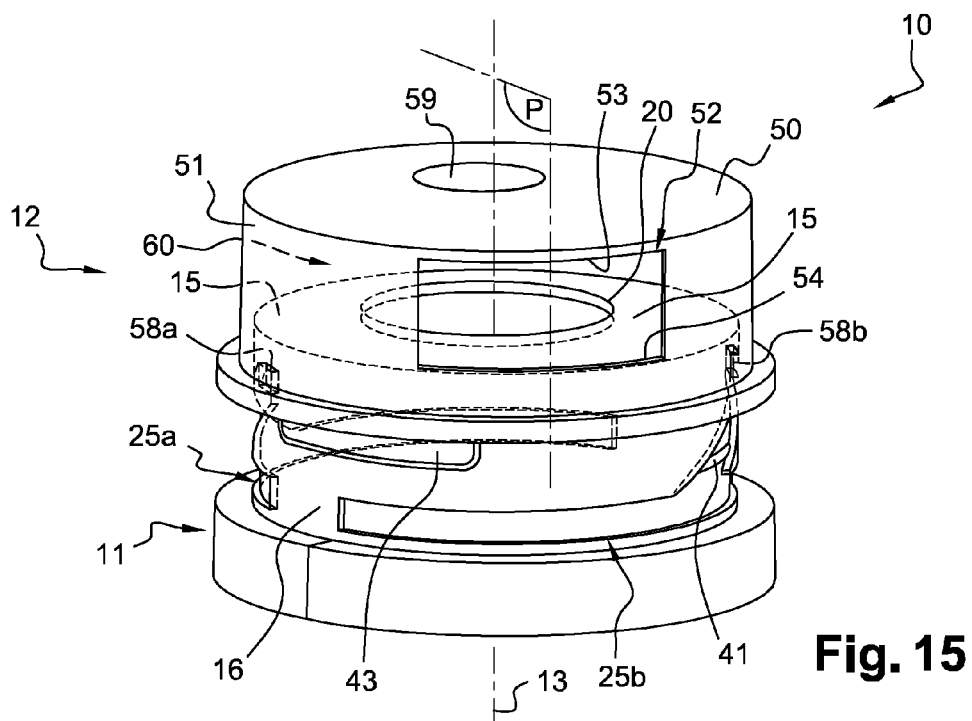
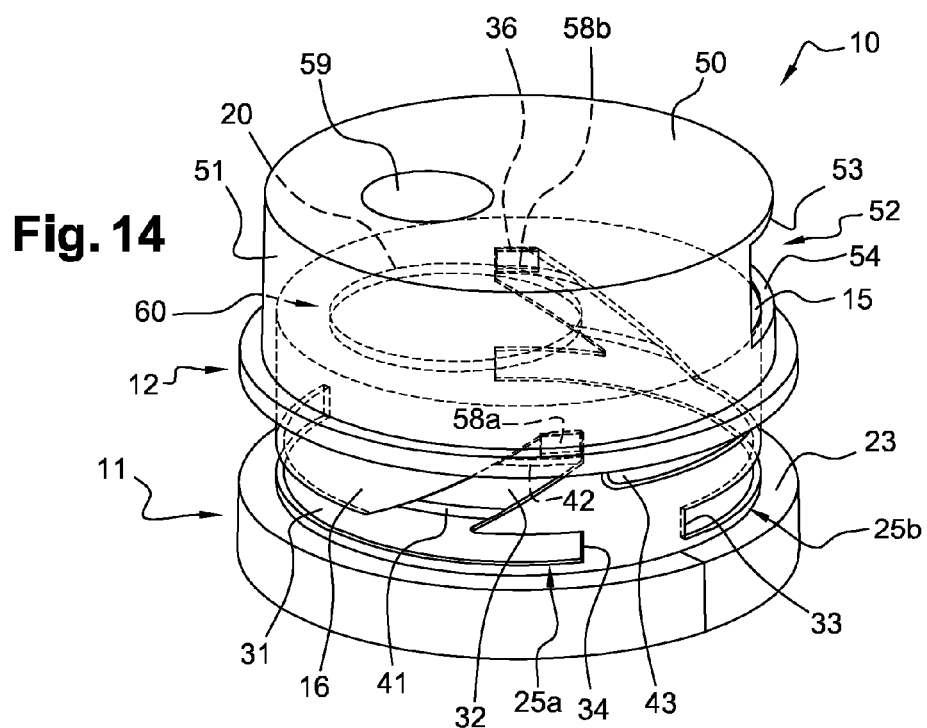


Fig. 12



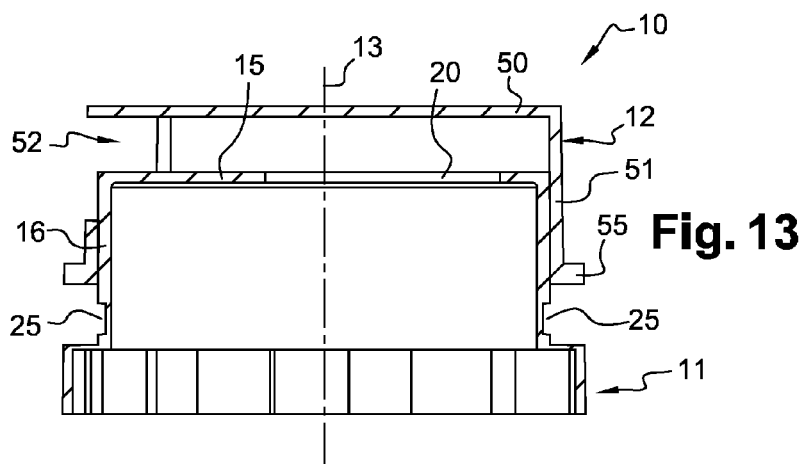
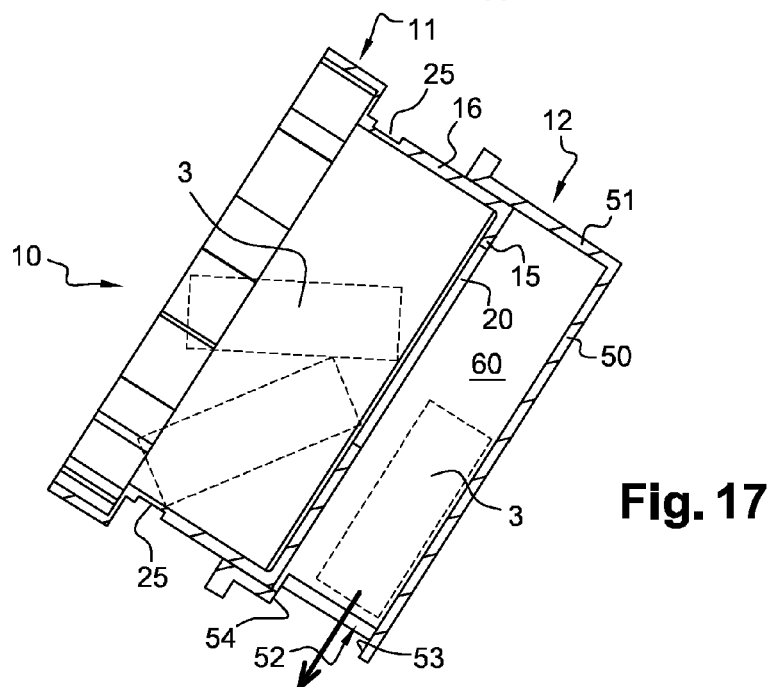
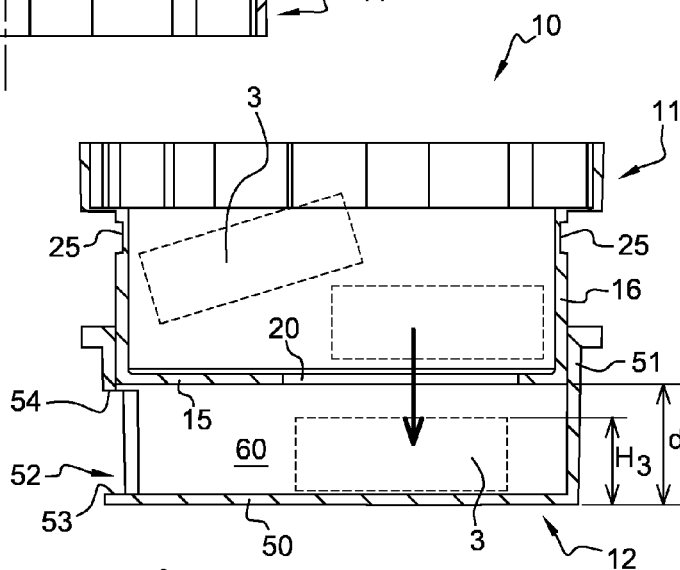


Fig. 16



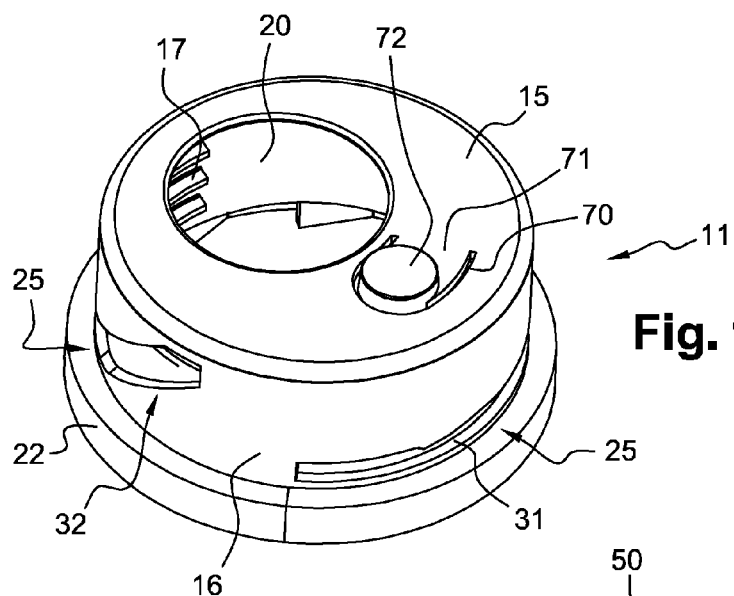


Fig. 19

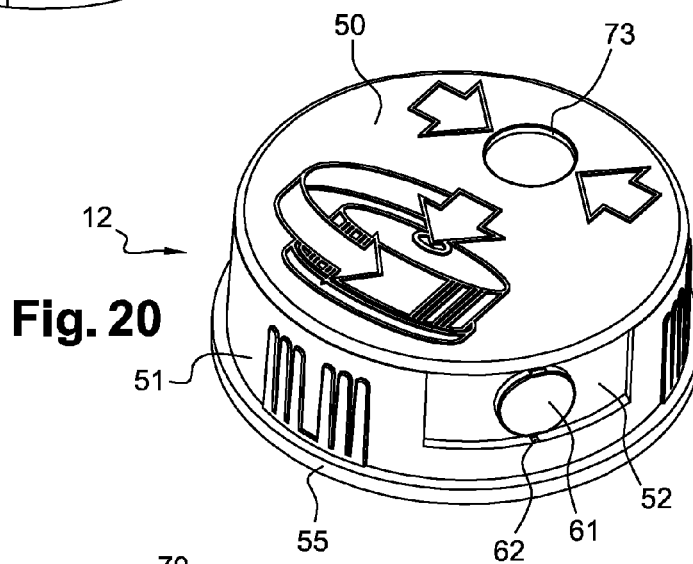


Fig. 20

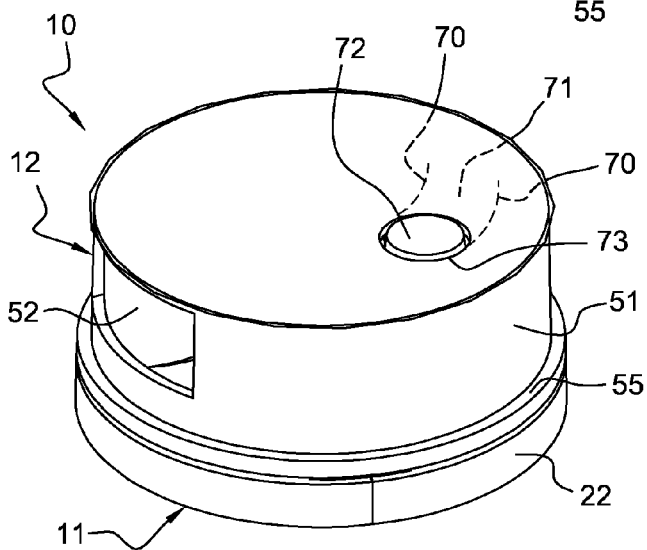
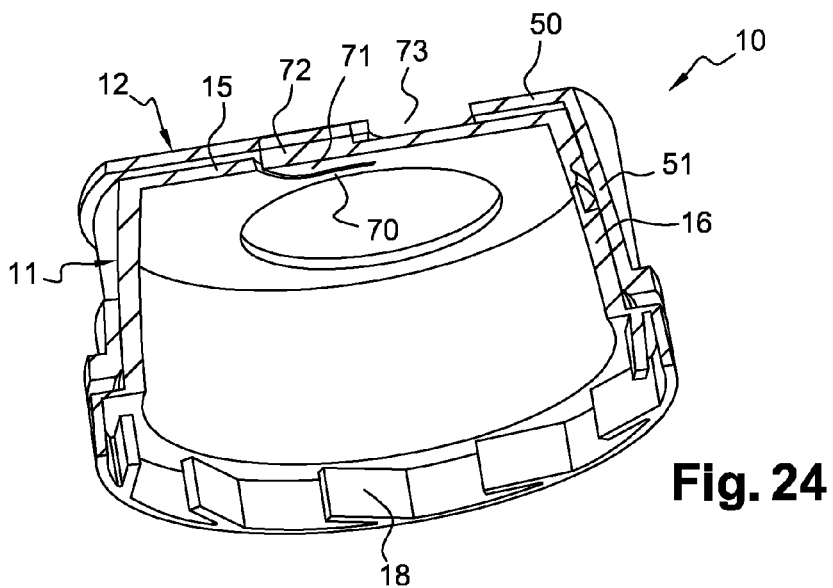
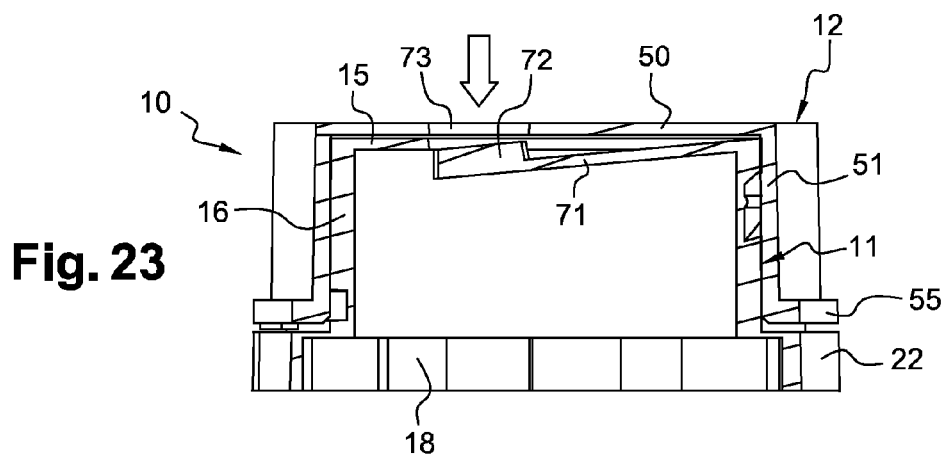
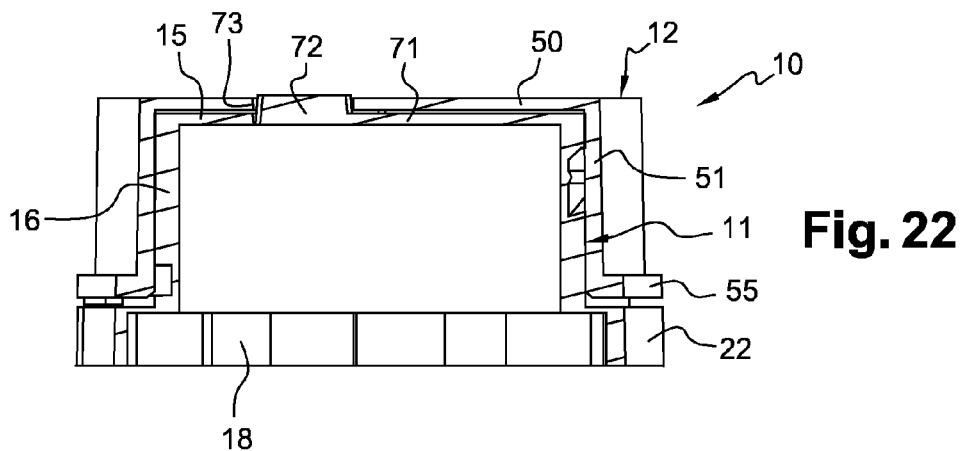


Fig. 21



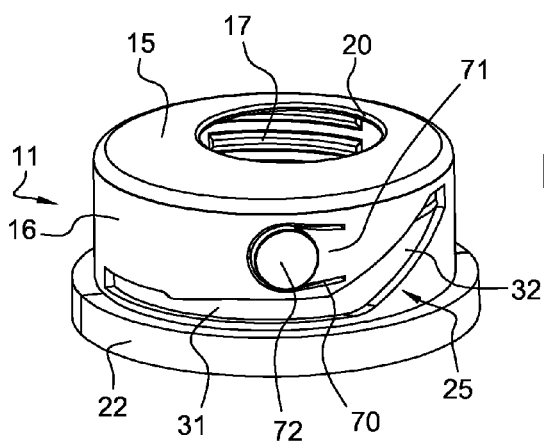


Fig. 25

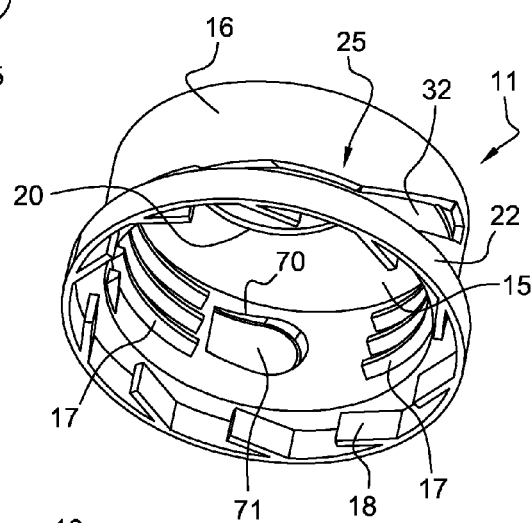


Fig. 26

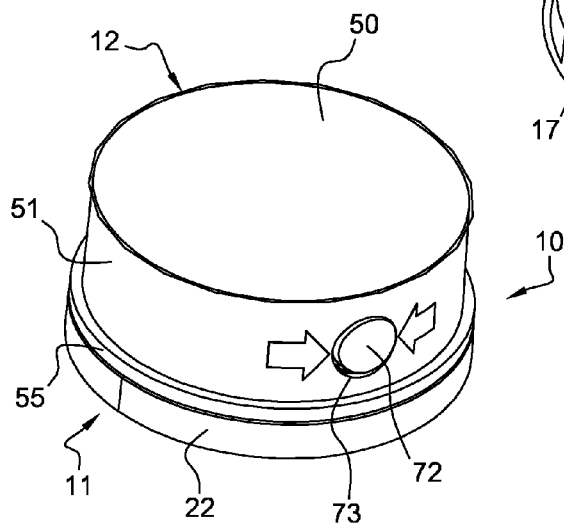


Fig. 27

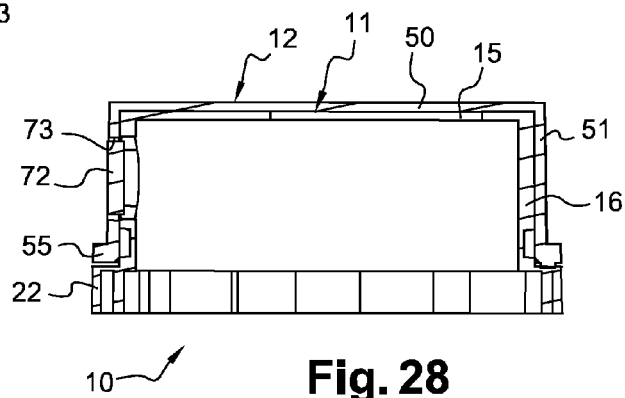


Fig. 28

DEVICE FOR DELIVERING A PELLET**CROSS REFERENCE TO RELATED APPLICATIONS**

[0001] The application is a National Phase Application of Patent Application PCT/FR2014/050684 filed on Mar. 19, 2015, which claims the benefit of and priority to French Patent Applications 14/52576 filed on Mar. 26, 2014 and 14/55843 filed on Jun. 24, 2014, the contents each of which are incorporated herein by reference in their entirety.

TECHNICAL FIELD

[0002] The present invention concerns a device for delivering a pellet, as well as a set comprising a recipient having a neck on which such a device is assembled.

[0003] In particular, the invention is applied to pellets of a product that is not desirable to touch, either because this could alter the properties of the product, or because this would be harmful to the skin.

[0004] More generally, the invention is applied to the dispensing of any type of pellets, that is to say solid objects which may have—or not—a cylindrical shape, such as a tablet of a cleaning product, a pharmaceutical pill, a candy, a chewing-gum sweet, etc.

BACKGROUND

[0005] There are already known devices enabling the delivery of pellets without the user having to take the pellet(s) with his fingers. Such a known device may be in the form of a plug having a fixed portion mounted on the neck of the recipient and a movable portion mounted on the fixed portion, between an open position and a closed position. Each of the fixed and movable portions presents an opening intended to let pellets pass: in the closed position, the openings do not enable the passage of pellets, whereas in the open position, the pellets can pass through the openings in order to come out of the recipient.

[0006] Nonetheless, the known devices present some drawbacks, such as:

[0007] the jamming of the pellets, which arise with an orientation that does not allow their exit via the openings, or which arise grouped into a set with dimensions too large to enable their passage via the openings, the pellets hindering each other at the exit;

[0008] the exit via the openings of a number of pellets greater than the desired number, which requires returning the pellets in the recipient, this not being always achievable or possibly requiring touching the pellets, unless not using all the pellets and therefore wasting them;

[0009] the risk of a drop of the delivered pellet(s) in an undesired location, due to their too rapid exit via the openings.

BRIEF SUMMARY

[0010] The invention aims to remedy to the aforementioned drawbacks.

[0011] To this end, according to a first aspect, the invention concerns a device for delivering a pellet, the device presenting an axis and comprising:

[0012] a base intended to be assembled to a neck of a recipient and presenting an orifice designed to enable the passage of a pellet contained in the recipient;

[0013] a cap movably mounted relative to the base between an open position and a closed position, and presenting an aperture designed to enable the passage of a pellet in the open position;

[0014] According to a general definition of the invention, the base includes a skirt fitted with means for assembly to the neck of the recipient and a transverse wall in which the orifice is formed. Furthermore, the cap is mounted on and around the base, substantially coaxially with the base, the cap including a transverse wall and a skirt in which the aperture is formed, the aperture being arranged over a portion of the height of the skirt. In addition, the skirt of the base presents, on its outer face, first guide means, and the skirt of the cap presents, on its inner face, second guide means, the first and second guide means being arranged to cooperate in order to enable the cap to be displaced relative to the base between:

[0015] the closed position, in which the transverse faces of the base and of the cap are substantially adjacent, the orifice and the aperture being substantially closed;

[0016] and the open position, in which the transverse faces of the base and of the cap are spaced apart axially, the cap and the base defining an intermediate chamber therebetween in which a pellet contained in the recipient can enter, via the orifice of the base, then come out, via the aperture of the cap.

[0017] Thus, concretely, a user acts on the cap so as to displace it relative to the base and therefore make the device switch from the closed position into the open position.

[0018] In the closed position, the passage of the pellets is not possible. By <<the transverse faces of the base and of the cap are substantially adjacent>>, is meant that these faces are very close to each other, for example spaced apart axially by 1 mm or less. By <<the orifice and the aperture being substantially closed>>, is meant that there is not enough space for the passage of a pellet. Nonetheless, clearances generally exist, and the device is not sealed, this not being necessary because the recipient does not contain a liquid or a pasty or powdered product but solid pellets.

[0019] In the open position, a user can turn the recipient, the closing device then being located below. A pellet can pass, by gravity, through the orifice of the base towards the intermediate chamber temporarily created between the base and the cap. This pellet stays in the intermediate chamber as long as the user has not tilted the recipient in order to make the pellet pass through the aperture provided in the lateral skirt. Alternatively, the user may turn the recipient with the device in the closed position, and only afterwards move the cap towards the open position.

[0020] The existence of this intermediate chamber, as well as the configuration of the chamber and the arrangement of the orifice and of the aperture, significantly reduce, even completely prevent, the unintended drop of a pellet. Indeed, the user has to carry out successively two different gestures (placing the recipient vertically but returned, then tilting the recipient) in order to enable a pellet to come out of the recipient.

[0021] Thanks to the aforementioned characteristics, the invention also allows controlling better the dispensing of the pellets one by one, thereby avoiding jams and the dispensing of a very large number of pellets.

[0022] According to a possible embodiment, the first and second guide means are designed so that the displacement of the cap relative to the base, between the closed and open

positions, is performed according to a translation and a rotation. For example, the magnitude of the rotation between the closed and open positions may be about a quarter turn. The fact of having to combine two movements, for example successively, in order to open the device makes the device difficult to open by a child.

[0023] The first and second guide means may comprise at least one a protrusion and the other a groove in which the protrusion is housed and is capable of being displaced. The protrusion may extend towards the skirt of the other element (base or cap), whereas the groove is open towards the skirt of the other element (cap or base). For example, the protrusion is formed on the cap and the groove is formed on the base.

[0024] Advantageously, the device may include two distinct grooves and two protrusions, each of the protrusions being housed and capable of being displaced in a dedicated groove. Thus, the grooves do not communicate with each other, and a protrusion remains in a groove, the other protrusion remaining in the other groove, during the displacement of the cap relative to the base between the closed and open positions.

[0025] The protrusions may be angularly offset by an angle comprised between 90 and 175°, for example about 170°. The two grooves are angularly offset in the same manner. Thus, there is only one possible way to make the cap pass into the open position. Conversely, if the protrusions were diametrically opposite to each other, and assuming that the user would forcibly make a protrusion pass in the groove in which it is not supposed to move, there would be two possible ways to displace the cap towards the open position. Hence, the advantage of a configuration of protrusions which are not diametrically opposite to each other is to have, in the open position, one single possible position of the cap with respect to the base. Thus, it is possible to place the orifice and the aperture with respect to each other in the most adequate position, as will be seen later on.

[0026] According to a possible embodiment, the or each groove includes:

[0027] a first portion in the form of a circular arc centered on the axis of the device;

[0028] a second portion which presents a first and a second ends, the second portion communicating, at its first end, with the first portion, so that the protrusion can pass from the first to the second portion and vice versa, the second portion extending obliquely with respect to the first portion, towards the transverse wall of the base—or of the cap—and in the direction of the opening movement of the device.

[0029] Typically, the second portion may be orientated so that the opening of the cap is performed by a rotation in the usual unscrewing direction.

[0030] The first portion of the groove may extend on either side of the first end of the second portion of the groove. In other words, when opening the cap, if the protrusion does not pass into the second portion, it can continue its circular path in the first portion. Such a movement does not allow opening the device, while giving the impression that it would enable this opening. This arrangement constitutes a safety measure to prevent a child from opening the device.

[0031] Furthermore, the device may include means creating a resistance to the displacement of the cap relative to the base when the protrusion is located in the vicinity of the first end of the second portion of the groove. For example, these

means are disposed so that this resistance is felt when the protrusion is located in the first portion of the groove, or possibly when it has already been displaced in the second portion of the groove in the opening direction of the device.

[0032] Such a resistance requires an additional effort in order to pursue the opening movement of the device. This may be achieved by reducing the transverse dimension of the groove, that is to say the passage section for the protrusion, by means of a bead protruding radially from the bottom of the groove, by one or several stud(s) formed on a lateral face of the groove, etc. Thus, these means constitute a safety for children who either cannot make this additional effort, or are dissuaded from displacing the cap in this way because of the resistance encountered. Conversely, these means are sized so that this additional effort could be easily provided by an adult.

[0033] Moreover, the base can have, on the outer face of its skirt, a visual indication which is located in correspondence with the aperture of the cap when the protrusion is located in the first portion of the groove in the vicinity of the first end of the second portion of the groove. Typically, this visual indication may indicate to the user that he should start pulling the cap, and not just rotating it. Thus, despite the—possible—presence of the aforementioned resistance, an adult may be prompted to displace the protrusion in the second portion of the groove and be therefore guided to manage to open the device. Preferably, the visual indication is not understandable by a child: it may therefore comprise of words rather than drawings.

[0034] According to a possible embodiment, the orifice is decentered with respect to the axis of the device, and the cap and the base are disposed with respect to each other so that, in the open position, the orifice of the base:

[0035] is substantially centered with respect to the plane of symmetry of the aperture of the cap passing through the axis of the device;

[0036] and is located on the side of the area of the skirt of the cap opposite to the aperture.

[0037] This configuration improves the dispensing of the pellets. Indeed, the radial spacing of the orifice with respect to the aperture allows avoiding that the pellet, once it has passed through the orifice, immediately pass through the aperture, thereby risking falling while the user still does not wish so. On the contrary, a temporary halt in the intermediate chamber is imposed. In addition, because of the centered arrangement of the orifice and of the aperture, with respect to the aforementioned plane of symmetry, the pellet which has just passed through the orifice is located centered with respect to the aperture, and has only to be displaced along the axis towards the aperture in order to come out of the device.

[0038] Moreover, the base and the cap may comprise one a stud and the other a hole, the stud being received in the hole before the first opening of the device, and the stud being intended to be broken during the first opening of the device. Thus, the stud forms a tamperproof seal.

[0039] The aperture may present:

[0040] an upper edge which is located substantially in the plane of the lower face of the transverse wall of the cap, the aperture thus being well closed in the closed position;

[0041] and/or a lower edge which is located substantially in the plane of the upper face of the transverse wall of the base, in the open position. Thus, the aperture

is sized in height so as to be completely cleared when the device is in the open position. An aperture with a larger height would not offer more passage dimension and could be harmful to the rigidity of the cap.

[0042] According to a possible embodiment, the protrusions are formed on the cap, and the aperture is disposed substantially symmetrically—circumferentially—between the two protrusions.

[0043] Moreover, the cap may comprise at least one rib protruding from its lower face, said rib being intended to rest on an annular collar of the base, in the closed position.

[0044] The device may further comprise means for blocking the cap in the open position. For example, these means, which are reversible, may be formed on the first or on the second guide means. They may comprise of an over-thickness such as a radial bead protruding from the bottom of the groove, allowing reducing the passage section for the protrusion.

[0045] According to a possible embodiment, a wall of the base comprises a cut-out forming a flexible leg, from which protrudes, towards the cap, a blocking member, and the cap includes a hole designed so that, in the closed position, the blocking member is housed in said hole of the cap and therefore prevents the displacement of the cap towards the open position. In addition, the leg may be elastically deformed subsequently to a pressure exerted on the blocking member, inwardly of the base, in order to clear the blocking member out of the hole of the cap, thereby enabling the displacement of the cap towards the open position. These characteristics ensure a safety function for children. Indeed, opening the device requires retracting the blocking member beforehand, by bending the leg, this not being obvious neither to be understood nor implemented by a child.

[0046] According to a second aspect, the invention concerns a set comprising a recipient having a neck, as well as a device as previously described, the base of the device being assembled to the neck of the recipient.

[0047] Typically, the recipient contains substantially identical pellets, which present a first shape according to a projection in a first plane and a second shape according to a projection in a second plane orthogonal to the first one. Advantageously:

[0048] the orifice of the base may have a shape substantially similar to that of the first shape of the pellet and dimensions slightly larger than those of said first shape;

[0049] and/or the aperture of the cap may have a shape similar to that of the second shape of the pellet and dimensions slightly larger than those of said second shape.

[0050] In the case where the pellets are substantially cylindrical, for example, this will translate as follows:

[0051] the first shape of the pellet—according to a projection in a first plane—is a circle, and the second shape of the pellet—according to a projection in a second plane—is a rectangle;

[0052] the orifice of the base has a substantially circular shape with a diameter slightly larger than the diameter of a pellet;

[0053] and/or the aperture of the cap has a height—that is to say a dimension along the axis of the device—slightly larger than the height of a pellet and a width slightly larger than the diameter of a pellet.

[0054] These arrangements aim to let pass only one single pellet at a time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055] As non-limiting examples, several possible embodiments of the invention are now described with reference to the appended figures:

[0056] FIG. 1 is a partial exploded perspective view of a recipient and of a device for delivering a pellet, according to one embodiment of the invention;

[0057] FIGS. 2 to 4 represent perspective views of the base of the device, according to different orientations;

[0058] FIG. 5 is a developed planar view of the skirt of the base;

[0059] FIGS. 6 and 7 represent perspective views of the cap of the device, according to different orientations;

[0060] FIG. 8 is a developed plan view of the skirt of the cap;

[0061] FIGS. 9 and 10 are respectively perspective and axial sectional views of the device in the closed position;

[0062] FIG. 11 shows a perspective view of the device upon completion of a first phase of the movement towards the open position;

[0063] FIGS. 12 and 13 show respectively perspective and axial sectional views of the device during a second phase of the movement towards the open position;

[0064] FIGS. 14 and 15 are perspective views, according to different orientations, of the device in the open position;

[0065] FIGS. 16 and 17 are axial sectional views of the device in the open position, showing the pellets dispensing mode;

[0066] FIG. 18 is a perspective view of a variant of the cap;

[0067] FIGS. 19 to 21 are perspective views of another variant of the invention, respectively showing a base, a cap, and a device comprising this cap mounted on this base, the cap being in the closed position;

[0068] FIGS. 22 to 24 are sectional views of the device of FIG. 21, respectively in the closed position, during a first phase of the opening movement of the cap, and during a second phase of the opening movement of the cap;

[0069] FIGS. 25 and 26 are perspective views of another variant of the invention, showing a base;

[0070] FIGS. 27 and 28 are respectively perspective and sectional views of a device comprising a cap mounted on the base of FIGS. 25 and 26, the cap being in the closed position.

DETAILED DESCRIPTION

[0071] FIG. 1 represents a set 1 comprising a recipient 2 and a device 10 for delivering pellets 3, the device 10 comprising a base 11 and a cap 12.

[0072] The recipient 2, which contains the pellets 3, presents an axis 4 and has a body 5 having a bottom (not represented) and a neck 6 defining a substantially circular opening 7. In the represented embodiment, the neck 6 is provided, on its outer face, with notches 8 and with a thread 9 located closer to the opening 7 of the recipient than the notches 8.

[0073] The device 10 is intended to be mounted on the neck 6. It presents an axis 13 which, in the mounted position, is substantially coincident with the axis 4 of the recipient 2, and which is also the axis of the base 11 and of the cap 12.

[0074] In the entire description, the terms <<axial>> and <<height>> will be used with reference to the direction of the axes 4, 13; the term <<radial>> corresponds to a direction orthogonal to the axes 4, 13. The set 1 and the device 10 are described in the position occupied in FIG. 1, that is to say with the axes 4, 13 substantially vertical and the opening 7 of the recipient turned upwards. The terms <<high>>, <<low>>, <<upper>> and <<lower>> will be used relative to this orientation. Nonetheless, it is understood that the set 1 may be orientated differently in the space, in particular in order to dispense a pellet, as illustrated in FIG. 16.

[0075] In the represented embodiment, the device 10 is especially intended to enable delivering substantially identical cylindrical-shaped pellets 3. As illustrated in FIG. 1, a pellet 3 presents a diameter D3 and a height H3. In particular, they may comprise of bleach pellets intended to be dissolved in water. Nonetheless, these characteristics should not be considered to be restrictive. The pellets may present other shapes, and/or other compositions (they may comprise of drugs, confectioneries, etc.).

[0076] The base 11 includes a transverse wall 15 and a skirt 16 fitted with means for assembly to the neck 6 of the recipient 2.

[0077] Preferably, these assembly means are designed so that the assembly of the base 11 to the neck 6 is undetachable. For example, these assembly means comprise, on the one hand, an internal thread 17 intended to cooperate with the thread 9 of the neck 6 and, on the other hand, inclined tabs 18 intended to cooperate with the notches 8 of the neck 6. Thus, the mounting of the base 11 on the neck 6 is performed by rotation of the base 11 in a first direction, this being possible because the tabs 18 slide on inclined faces of the notches 8. Conversely, the rotation of the base 11 in the opposite direction, in order to dismount the base 11, is not possible, the tabs 18 abutting against right faces of the notches 8.

[0078] In the transverse wall 15 is arranged an orifice 20 designed to enable the passage of a pellet 3 contained in the recipient 2. In order to enable the passage of only one pellet 3 at a time, the orifice 20 may present a substantially circular shape with a diameter D20 slightly larger than the diameter D3 of a pellet 3.

[0079] In the represented embodiment, the orifice 20 is decentered with respect to the axis 13 of the device 11, that is to say that the axis 21 of the orifice 20 is not coincident with the axis 13 of the device 11 (see FIGS. 3 and 4). Nonetheless, the axis 13 of the device 11 herein passes through the orifice 20.

[0080] The skirt 16 of the base 11 comprises, at its lower portion, an annular collar 22 presenting an L-shaped section. Thus, the annular collar 22 forms a transverse wall 23 (that is to say orthogonal to the axis 13) prolonged, downwards, by a peripheral wall 24. In the represented embodiment, the tabs 18 are arranged on the inner face of the peripheral wall 24.

[0081] In addition, the skirt 16 includes, on its outer face, first guide means, in the form of two distinct grooves 25, namely a first groove 25a and a second groove 25b, which herein are substantially identical.

[0082] The grooves 25 do not pass across the thickness of the skirt 16 in order, on the one hand, not to weaken too much the structure of the base 11 and, on the other hand, not to constitute a passage communicating between the inside

and the outside of the recipient 2. Each groove 25 presents a bottom 26 as well as two lateral walls 27 facing each other.

[0083] Each groove 25 includes a first portion 31 in the form of a circular arc centered on the axis 13 of the base 11, and located at the lower portion of the skirt 16, for example in the vicinity of the transverse wall 23 of the annular collar 22. The first portion 31 extends between a first end 33 and a second end 34, for example over an angle $\alpha 1$ in the range of 140 to 150°.

[0084] In addition, each groove 25 includes a second portion 32, which presents a first end 35 and a second end 36. The second portion 32 of the groove 25 communicates with the first portion 31 of the groove 25 at its first end 35. This first end 35 of the second portion 32 is located between the ends 33, 34 of the first portion 31. In other words, the first portion 31 of the groove 25 extends on either side of the first end 35 of the second portion 32.

[0085] For example, the first end 35 of the second portion 32 may be angularly offset from the first end 33 of the first portion 31 of the groove 25 by an angle $\alpha 2$, for example in the range of 90 to 110°.

[0086] The second portion 32 of the groove 25 extends obliquely with respect to the first portion 31, towards the transverse wall 15 of the base 11 and the second end 34 of the first portion 31, which corresponds to the direction of the opening movement of the device 10. The second end 36 of the second portion 32 of the groove 25 is for example substantially aligned, along the axial direction, with the second end 34 of the first portion 31. As illustrated in FIG. 8, the second portion 32 of the groove 25 may be substantially rectilinear (in a developed plan view).

[0087] In addition, each groove 25 includes, in the second portion 32, two radial beads protruding from the bottom 26 of the groove 25 and extending in a plane orthogonal to the axis 13 from a lateral wall 27 to the other. Thus, each groove 25 includes a first bead 41 located in the vicinity of the first end 35, and a second bead 42 located in the vicinity of the second end 36. The role of these beads will be explained later on.

[0088] The two grooves 25 herein are substantially identical. Nonetheless, they are not disposed symmetrically at the periphery of the skirt 16 of the base 11. Thus, as illustrated in FIG. 8, the angle $\beta 1$ between the second end 34 of the first groove 25a and the first end 33 of the second groove 25b is different from the angle $\beta 2$ between the second end 34 of the second groove 25b and the first end 33 of the first groove 25a. For example, the angle $\beta 1$ may be in the range of 25 to 30°, whereas the angle $\beta 2$ may be in the range of 45 to 50°.

[0089] Furthermore, the base 11 has a visual indication 43 on the outer face of the skirt 16. For example, the visual indication 43 is located in the vicinity of the second end 36 of the second portion 32 of the first groove 25a (FIG. 8).

[0090] Moreover, a substantially axial hole 44 may be formed in the transverse wall 23 of the annular collar 22 of the base 11. The function of this hole will be specified later on.

[0091] The cap 12 comprises a transverse wall 50 and a skirt 51, preferably devoid of any internal thread. The diameter and the height of the cap 12 are slightly larger than those of the base 11, so that the cap 12 can be mounted on and around the base 11, substantially coaxially with the base 11.

[0092] The skirt 51 of the cap 12 presents an aperture 52 designed to enable the passage of a pellet 3 contained in the recipient 2. In order to enable the passage of only one pellet 3 at a time, the aperture 52 may have a height H52 slightly larger than the height H3 of a pellet 3 and a width L52 slightly larger than the diameter D3 of a pellet 3.

[0093] The aperture 52 presents, on the one hand, an upper edge 53 which, in the represented embodiment, is located substantially in the plane of the lower face of the transverse wall 50 of the cap 12 and, on the other hand, a lower edge 54. The aperture 52 extends only over a portion of the height of the skirt 51 and not over the entire height thereof. As illustrated in FIGS. 5 and 6, the aperture 52 has a plane of symmetry P passing through the axis 13 of the device 10.

[0094] The cap 12 also has a peripheral rim 55 protruding from the outer face of the skirt 51, at the free end of the skirt 51. This peripheral rim 55 may allow increasing the rigidity of the cap 12.

[0095] From the lower face of the peripheral rim 55 may protrude one or several rib(s) 56, herein three circular-arc shaped ribs 56 evenly spaced angularly, as well as a substantially axial stud 57.

[0096] In addition, the skirt 51 includes, on its inner face, second guide means, in the form of two distinct protrusions 58, namely a first protrusion 58a and a second protrusion 58b, which herein are substantially identical.

[0097] The protrusions 58 are intended to cooperate with the grooves 25 formed on the base 11. More specifically, each of the protrusions 58a, 58b is housed and capable of being displaced in a dedicated groove, respectively 25a and 25b.

[0098] Hence, each protrusion 58 presents a shape adapted to the groove 25. In the represented embodiment, each protrusion 58 has a parallelepiped shape the dimensions of which are adapted to those of the groove in order to obtain a cooperation and a satisfactory guidance.

[0099] The protrusions 58 are arranged proximate to the lower edge of the skirt 50. They are angularly offset by an angle γ comprised between 90 and 175°, for example about 170°. Furthermore, as illustrated in FIG. 5, the aperture 52 may be disposed substantially symmetrically—circumferentially—between the two protrusions 58.

[0100] The cap 12 is movably mounted relative to the base 11 between a closed position and an open position. To this end, a user should act on the cap, according to a translation and rotation combination, as will be described later on. During this action of the user, the protrusions 58 are displaced in the grooves 25 while remaining guided in the latter, and the cap 12 can therefore be displaced relative to the base 11 between:

[0101] the closed position, in which the transverse faces 15, 50 of the base 11 and of the cap 12 are substantially adjacent, the orifice 20 and the aperture 52 being substantially closed;

[0102] and the open position, in which the transverse faces 15, 50 of the base 11 and of the cap 12 are spaced apart axially, which frees the passage for a pellet 3 coming out from the recipient 2 via the orifice 20 and then the aperture 52.

[0103] Moreover, the transverse wall 50 may include a visual marker 59 allowing indicating to the user that the cap 12 is in the open position, and that the device 10 is therefore ready to deliver a pellet 3. For example, the cap 12 can be made of a transparent material allowing seeing the orifice 20

of the base 11, whereas the visual marker 59 is opaque. Typically, the different components of the device 10 may be arranged so that the visual marker 59 is placed in correspondence—axially—with the orifice 20 when the device 10 is open. In the represented embodiment, the visual marker 59 is circular.

[0104] The different phases for the passage of the device 10 from the closed state into the open state are now described with reference to FIGS. 9 to 17.

[0105] FIGS. 9 and 10 represent the device 10 in the closed position.

[0106] In this position, the transverse faces 15, 50 of the base 11 and of the cap 12 are substantially adjacent. Preferably, the pressure of the cap 12 on the base 11 is done between the ribs 56 of the cap 12 and the transverse wall 23 of the annular collar 22 of the base 11. This, combined with an adequate sizing of the height of the skirts 16, 51 of the base 11 and of the cap 12, allows avoiding that the transverse faces 15, 50 press on each other, in the closed position. Indeed, there would then be a risk that particles which might be detached from the pellets 3 create scratches on either one of these transverse faces 15, 50 during the displacement of the cap 12 relative to the base 11.

[0107] Thus, preferably, an axial clearance exists between the transverse walls 15, 50. Nonetheless, this clearance is very small (typically smaller than 1 mm). Therefore, the orifice 20 is closed by the transverse wall 50 of the cap 12, to the extent that it does not enable the passage of a pellet 3. The aperture 52 is also closed, since it is located opposite the skirt 16 of the base 11.

[0108] Furthermore, the visual marker 59 of the cap is offset transversely with respect to the orifice 20.

[0109] Moreover, prior to the first opening of the device 10, the stud 57 of the cap 12 is received in the hole 44 of the base 11.

[0110] In the closed position, each of the protrusions 58 is located in the vicinity of or in abutment against the first end 33 of the first portion 31 of the corresponding groove 25.

[0111] The transverse face 50 of the cap 51 can comprise a visual indication (not represented), for example a pictogram, indicating the movements to be performed by the operator in order to open the device 10.

[0112] In order to open the device 10, during a first phase, the user rotates the cap 12 around the axis 13.

[0113] During the first opening of the device 10, this rotation results in the breakage of the stud 57. The generated noise constitutes an auditive proof indicating that the recipient 2 has never been opened.

[0114] The rotational movement of the cap 12 relative to the base 11 is guided by the protrusions 58 which are displaced in the first portion 31 of the grooves 25. The angular offset between the protrusions 58 and the angular offset between the grooves 25 are provided so that, at any time during the opening or the closure of the device 10, the localization of the first protrusion 58a in the first groove 25a is substantially identical to the localization of the second protrusion 58b in the second groove 25b.

[0115] When the protrusions 58, always located in the first portion 31 of the grooves 25, substantially reach the first end 35 of the second portion 32 of the grooves 25, the visual indication 43 formed on the base 11 is located in correspondence with the aperture 52 of the cap 12. This position is illustrated in FIG. 11. The visual marker 59 of the cap is always offset transversely with respect to the orifice 20.

[0116] From this position, the pursuit of the rotational movement of the cap 12 around the axis 13 would result in the displacement of the protrusions 58 in the first portion 31 of the grooves 25, until they abut against the second end 34 of this first portion. Such a movement does not allow opening the device 10 in order to dispense a pellet 3. Nevertheless, this movement, which is in the continuity of the initial movement, is the one practiced naturally by the user.

[0117] In order to achieve the opening of the device 10 from the position illustrated in FIG. 11, the user should make the protrusions 58 pass in the second portion 32 of the grooves 25, by imparting an <<unscrewing>> type movement to the cap 12, involving both a rotation and an upward pulling of the cap 12. The user is herein assisted by the visual indication 43 which is now apparent, through the aperture 52. This visual indication 43 being preferably understandable only by adults, the device 10 is designed to prevent the opening by a child, who would merely make the cap 12 rotate around the axis 13.

[0118] In addition, when the protrusion 58 starts being displaced in the second portion of the groove 25, it has to overcome the first bead 41. This creates a resistance to the displacement of the cap 12 relative to the base 11. Hence, this arrangement allows reinforcing safety in regards to children who generally do not have the force required for the pursuit of the opening movement of the device 10.

[0119] FIGS. 12 and 13 illustrate the device 10 during opening, once the protrusions 58 have overcome the first bead 41 and continue their displacement in the second portion 32 of the grooves 25, as the user <21 unscrews>> the cap 12.

[0120] As can be seen in FIGS. 12 and 13, the <<unscrewing>> movements of the cap 12 results in the progressive increase of the distance between the transverse walls 15, 50. Hence, the orifice 20 is no longer closed by the transverse wall 50 of the cap 12. For convenience, in FIG. 13, the thread 17 has not been represented.

[0121] The unscrewing movement of the cap 12 continuing, the protrusions 58 will have to overcome the second bead 42, before finally reaching the second end 36 of the second portion 32 of the grooves 25, which corresponds to the open position of the device 10, as illustrated in FIGS. 14, 15 and 16.

[0122] The beads 42 prevent an unintentional downward displacement of the protrusions 48, thereby forming means for blocking the cap 12 in the open position.

[0123] In the open position, the device 10 presents the following characteristics.

[0124] The transverse walls 15, 50 are spaced apart by a distance d substantially equal to or larger than the height H52 of the aperture 52 and larger than the height H3 of a pellet 3 (see FIG. 16). For example, the lower edge 54 of the aperture 52 is located substantially in the plane of the upper face of the transverse wall 15 of the base 11. Hence, the aperture 52 is free and enables the passage of a pellet 3.

[0125] Thus, the cap 12 and the base 11 define an intermediate chamber 60 therebetween, in which a pellet 3 contained in the recipient 2 can enter, via the orifice 20 of the base 11, and then come out, via the aperture 52 of the cap 12.

[0126] The visual marker 59 of the cap is placed in correspondence—axially—with the orifice 20.

[0127] In addition, the cap 12 and the base 11 are disposed with respect to each other so that, in the open position, the orifice 20 of the base 11:

[0128] is substantially centered with respect to the plane of symmetry P of the aperture 52 of the cap 12 passing through the axis 13 of the device 10;

[0129] and is located on the side of the area of the skirt 51 of the cap 12 opposite to the aperture 52.

[0130] When the device 10 is in the open position, a pellet 3 can be delivered. For this purpose, the user rotates the recipient 2 fitted with the device 10. Note that the opening movement of the device 10 may be performed in the position illustrated in FIG. 1, the recipient 2 being subsequently turned over, or directly in the reversed position illustrated in FIG. 16.

[0131] A pellet 3, and preferably only but one single pellet 3, can pass via the orifice 20 and fall flat on the transverse wall 50 of the cap 12.

[0132] Then, the user can tilt the recipient 2 so as to orient the aperture 52 downwards. A pellet 3 can then slide on the transverse wall 50 of the cap 12 towards the aperture 52, and be delivered. Because of the aforementioned relative arrangement of the orifice 20 of the base 11 and of the aperture 52 of the cap 12, the pellet 3, once fallen on the transverse wall 50 of the cap 12, is located in the axis of the aperture 52, which facilitates its exit without jams.

[0133] Note that, for convenience, in FIGS. 16 and 17, the thread 17 has not been represented.

[0134] The closure of the device 10 is performed according to the reverse movement: in a first place, the cap 12 is displaced relative to the base 11 according to a screwing-type movement, the protrusions 58 moving in the second portion 32 of the grooves 25. Then, the protrusions 58 pass into the first portion 31 of the grooves 25, until the first end 33, the cap 12 then being only subjected to a rotational movement around the axis 13 relative to the base 11.

[0135] Reference is now made to FIG. 18 which illustrates a variant of the cap 51.

[0136] In the embodiment of FIG. 18, the cap 51 is identical to the previously described one, but it is provided with a different tamperproof seal.

[0137] This tamperproof seal herein comprises an element 61 arranged in the aperture 52 and connected to at least two edges thereof via breakable bridges 62. Before the first opening, the bridges 62 are intact and the element is disposed to close at least partially the aperture 52, in order to prevent the exit of a pellet 3. Before making the first pellet 3 come out, a user should take away the element 61 by breaking the bridges 62.

[0138] Preferably, the element 61 does not occupy the entire aperture 52, in order to preserve a space in which the user can place his fingers so as to grasp the element 61.

[0139] In FIG. 18, for example, the element 61 is a disc connected via a bridge 62 to the upper edge 53 and via a bridge 62 to the lower edge 64. Nonetheless, other embodiments may be considered.

[0140] Because of the presence of the element 61, the stud 57 and the hole 44 described before may be omitted.

[0141] Reference is now made to FIGS. 19 to 24 which illustrate another variant according to the invention of a device 10 for delivering pellets 3.

[0142] The base 11 and the cap 12 are substantially identical to those described before, with the differences described hereinafter.

[0143] As illustrated in FIG. 19, the base 11 comprises, in its transverse wall 15, a cut-out 70 which forms a leg 71. In the represented embodiment, the cut-out substantially forms a U-shape, the leg 71 being oblong-shaped with a rounded end. The leg 71 is integral with the transverse wall 15 and may be located, at rest, substantially in the plane thereof, as can be seen in particular in FIG. 22.

[0144] From this leg 71 protrudes, towards the cap 12, a blocking member 72 which herein comprises of a button in the form of a flat cylinder. Preferably, the blocking member 72 is located at the free end of the leg 71.

[0145] As regards the cap 12, illustrated in FIG. 20, it includes a hole 73 in which the blocking member 72 is engaged when the cap 12 is in the closed position, as represented in FIG. 21.

[0146] As can be seen more particularly in FIG. 22, when the cap 12 is in the closed position, the blocking member 72 may substantially flush with the upper face of the transverse wall 50 of the cap 12. The hole 73 is designed so that the blocking member 72 prevents the displacement of the cap 12 towards the open position as long as it is housed in the hole 73. To this end, the hole 73 can have a shape substantially identical to that of the blocking member 72 and with slightly larger dimensions.

[0147] Because of the cut-out 70, the leg 71 is flexible: thus, a pressure exerted on the leg 71 inwardly of the base 11, via the blocking member 72, results in a deformation of the leg 71, typically a bending, as can be seen in FIG. 23. Hence, by pressing on the blocking member 72, a user can clear the blocking member 72 out of the hole 73 of the cap 12. The rotational movement of the cap 12 relative to the base 11 is then no longer hindered, and the device 10 can be opened.

[0148] It is to be noted that the deformation of the leg 71 is elastic. Thus, after some rotation of the cap 12 relative to the base 11, the blocking member 72 is no longer opposite the hole 73 and, in the absence of a pressure of the user, the leg 71 tends to return back towards its rest position. As illustrated in FIG. 24, the blocking member 72 is then located against the lower face of the transverse wall 50 of the cap 12, which does not hamper the pursuit of the opening movement of the device 10. The fact that the leg 71 can resiliently return back to its rest position guarantees the maintenance of the safety function in regards to children each time the device 10 is reclosed.

[0149] In the represented embodiment, which nevertheless is not restrictive, each groove 25 is such that the first end 35 of the second portion 32 is located substantially at the level of the second end 34 of the first portion 31. In other words, the first portion 31 of each groove 25 does not extend beyond the first end 35 of the second portion 32, as has been the case for the embodiment represented in FIGS. 1 to 17. Indeed, the safety function aiming to prevent a child from opening the device 10 is assigned to the blocking member 72.

[0150] Reference is now made to FIGS. 25 to 28 which illustrate another variant according to the invention of a device 10 for delivering pellets 3.

[0151] This device 10 is similar to that represented in FIGS. 19 to 24, with the exception of the positioning of the leg 71 and of the hole 73.

[0152] Indeed, herein, the leg 71 carrying the blocking member 72 is formed in the skirt 16 of the base, as can be seen in FIG. 25. In order to make this arrangement possible,

the internal thread 17 of the base 11 is interrupted at least at the level of the leg 71 (see FIG. 26). For example, the thread 17 may be formed into three portions angularly spaced from each other, this does not hinder the set-up of the base 11 on the neck 6 of the recipient 2.

[0153] In addition, the hole 73 intended to receive the blocking member 72, when the device 10 is in the closed position, is formed in the skirt 51 of the cap 12.

[0154] As described before, when the cap 12 is in the closed position, the blocking member 72, engaged in the hole 73, prevents the rotation of the cap 12 towards its open position (FIGS. 27 and 28). A pressure exerted on the blocking member 72, inwardly, results in the elastic deformation of the leg 71 and therefore in the disengagement of the blocking member 72 out from the hole 73, thereby enabling the opening of the device 10.

[0155] Thus, the invention brings a decisive improvement to the prior art, by providing a device which allows delivering pellets one by one, with the risks of jams and accidental drops significantly reduced.

[0156] It goes without saying that the invention is not limited to the embodiments described hereinabove as examples but it encompasses all technical equivalents and variants of the described means as well as their combinations.

1. A device for delivering a pellet, the device presenting an axis and comprising:

- a base intended to be assembled to a neck of a recipient and presenting an orifice designed to enable the passage of a pellet contained in the recipient;
- a cap movably mounted relative to the base between an open position and a closed position, and presenting an aperture designed to enable the passage of a pellet in the open position;

characterized in that:

- the base includes a skirt fitted with means for assembly to the neck of the recipient and a transverse wall in which the orifice is formed;
- the cap is mounted on and around the base, substantially coaxially with the base, the cap including a transverse wall and a skirt in which the aperture is formed, the aperture being arranged over a portion of the height of the skirt;

the skirt of the base presenting, on its outer face, first guide means, and the skirt of the cap presenting, on its inner face, second guide means, the first and second guide means being arranged to cooperate in order to enable the cap to be displaced relative to the base between:

- the closed position, in which the transverse faces of the base and of the cap are substantially adjacent, the orifice and the aperture being substantially closed;
- and the open position, in which the transverse faces of the base and of the cap are spaced apart axially, the cap and the base defining an intermediate chamber therebetween in which a pellet contained in the recipient can enter, via the orifice of the base, and then come out, via the aperture of the cap.

2. The device according to claim 1, characterized in that the first and second guide means are designed so that the displacement of the cap relative to the base, between the closed and open positions, is performed according to a translation and a rotation.

3. The device according to claim 1, characterized in that the first and second guide means comprise at least one a

protrusion and the other a groove in which the protrusion is housed and is capable of being displaced.

4. The device according to claim 3, characterized in that it comprises two distinct grooves and two protrusions, each of the protrusions being housed and capable of being displaced in a dedicated groove.

5. The device according to claim 4, characterized in that the protrusions are angularly offset by an angle comprised between 90 and 175°, for example in the range of 170°.

6. The device according to claim 3, characterized in that the or each groove includes:

a first portion in the form of a circular arc centered on the axis of the device;

a second portion which presents a first and a second ends, the second portion communicating, at its first end, with the first portion, so that the protrusion can pass from the first to the second portion and vice versa, the second portion extending obliquely with respect to the first portion, towards the transverse wall of the base or of the cap and in the direction of the opening movement of the device.

7. The device according to claim 6, characterized in that the first portion extends on either side of the first end of the second portion.

8. The device according to claim 6, characterized in that it comprises means creating a resistance to the displacement of the cap relative to the base when the protrusion is located in the vicinity of the first end of the second portion of the groove.

9. The device according to claim 6, characterized in that the base has, on the outer face of its skirt, a visual indication which is located in correspondence with the aperture of the cap when the protrusion is located in the first portion of the groove in the vicinity of the first end of the second portion of the groove.

10. The device according to claim 1, characterized in that the orifice is decentered with respect to the axis of the device, and in that the cap and the base are disposed with respect to each other so that, in the open position, the orifice of the base:

is substantially centered with respect to the plane (P) of symmetry of the aperture of the cap passing through the axis of the device;

and is located on the side of the area of the skirt of the cap opposite to the aperture.

11. The device according to claim 1, characterized in that the base and the cap comprise one a stud and the other a hole, the stud being received in the hole before the first opening of the device, and the stud being intended to be snapped during the first opening of the device.

12. The device according to claim 1, characterized in that the aperture presents an upper edge which is located substantially in the plane of the lower face of the transverse wall of the cap.

13. The device according to claim 1, characterized in that the aperture presents a lower edge which is located substantially in the plane of the upper face of the transverse wall of the base, in the open position.

14. The device according to claim 4, characterized in that the protrusions are formed on the cap, and in that the aperture is disposed substantially symmetrically—circumferentially—between the two protrusions.

15. The device according to claim 1, characterized in that the cap comprises at least one rib protruding from its lower face, said rib being intended to rest on an annular collar of the base, in the closed position.

16. The device according to claim 1, characterized in that it comprises means for blocking the cap in the open position.

17. The device according to claim 1, characterized in that a wall of the base comprises a cut-out forming a flexible leg, from which protrudes, towards the cap, a blocking member, and in that the cap includes a hole designed so that, in the closed position, the blocking member is housed in said hole of the cap and therefore prevents the displacement of the cap towards the open position, the leg being capable of being elastically deformed subsequently to a pressure exerted on the blocking member, inwardly of the base, in order to clear the blocking member out of the hole of the cap, thereby enabling the displacement of the cap towards the open position.

18. A set comprising a recipient having a neck, characterized in that it comprises a device according to any of the preceding claims, the base of the device being assembled to the neck of the recipient.

19. The set according to claim 18, characterized in that the recipient contains substantially identical pellets which present a first shape according to a projection in a first plane and a second shape according to a projection in a second plane orthogonal to the first one, and in that the orifice of the base has a shape similar to that of the first shape of the pellet and dimensions slightly larger than those of said first shape.

20. The set according to claim 18, characterized in that the recipient contains substantially identical pellets which present a first shape according to a projection in a first plane and a second shape according to a projection in a second plane orthogonal to the first one, and in that the aperture of the cap has a shape similar to that of the second shape of the pellet and dimensions slightly larger than those of said second shape.

* * * * *