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(54) **Reclosable opening device for sealed sheet material packages of pourable food products**

Wiederverschliessbare Öffnungsvorrichtung für Packungen aus versiegelter Folie für ausgiessbare Nahrungsmittel

Dispositif d'ouverture refermable pour conditionnements en feuille scellé de produits alimentaires versables

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Description

[0001] The present invention relates to a reclosable opening device for sealed sheet material packages of pourable food products.

[0002] As is known, many pourable food products, such as fruit juice, UHT (ultra-high-temperature-treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized sheet packaging material.

[0003] A typical example of this type of package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding and sealing a web of laminated packaging material. The packaging material has a multilayer structure comprising a layer of fibrous material, e.g. paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene, and, in the case of aseptic packages for long-storage products, such as UHT milk, also comprises a layer of oxygen-barrier material, defined, for example, by aluminium foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material eventually defining the inner face of the package contacting the food product.

[0004] Such packages are normally produced on fully automatic packaging machines, on which a continuous tube is formed from the web-fed packaging material; the web of packaging material is sterilized on the packaging machine itself, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, once sterilization is completed, is removed, e.g. vapourized by heating, from the surfaces of the packaging material; and the web of packaging material so sterilized is kept in a closed, sterile environment, and is folded and sealed longitudinally to form a vertical tube.

[0005] The tube is filled with the sterilized or sterile-processed food product, and is sealed and cut along equally spaced transverse sections to form pillow packs, which are then folded mechanically to form the finished, e.g. substantially parallelepiped-shaped, packages.

[0006] Alternatively, the packaging material may be cut into blanks, which are folded on forming spindles into packages, which are then filled with the food product and sealed. One example of the this type of package is the so-called "gable-top" package known by the trade name Tetra Rex (registered trademark).

[0007] To open such packages, various solutions have been proposed, a first of which, described in Patents US 4,655,387 and US 4,410,128, comprises forming, at the corner of a flap of the package, a preferential tear line defined by a succession of perforations extending through the outer layers of the packaging material down to the layer of barrier material, and the package is opened by lifting the flap and cutting or tearing along the perforations. Once opened, packages of this type, obviously, cannot be closed, and must therefore be handled carefully to prevent spillage until all the food product in the package has been consumed.

[0008] To eliminate this drawback, packages of the above type have been fitted with reclosable opening devices, which substantially comprise a frame defining an opening and fitted about a hole or a pierceable or removable portion in a wall of the package; and a cap hinged to the frame. The cap is normally molded integrally with the frame, and is initially sealed to it, along a peripheral edge surrounding the opening, by a thin breakable annular connecting portion. Once unsealed, the cap is movable between a closed position, in which it cooperates hermetically with the frame, and an open position. Alternatively, threaded caps, separate from and initially screwed to the frame, are also used.

[0009] One problem encountered with opening devices of the above type is that the cap must be detachable from the frame with practically no effort when unsealing the package. For which reason, the opening devices are made of easy-to-break plastic material, normally polyethylene.

[0010] Polyethylene, however, has the drawback of being a poor oxygen barrier. Consequently, the side of the packaging material eventually defining the inside of the package must be fitted over the hole with an additional "patch" element defined by a small sheet of heat-seal plastic material, and the opposite side of the packaging material must be fitted with an oxygen-barrier element, e.g. a pull-off tab, which is heat sealed to the patch element and provided with a layer of aluminium.

[0011] Providing the packages with barrier and patch elements involves additional processing of the packaging material before it is sterilized and folded and sealed to form the vertical tube, thus increasing production time and cost of the packages.

[0012] Moreover, once the cap is unsealed, the user must also remove the barrier element for access to the content of the package.

[0013] Reclosable opening devices have therefore been proposed, by which to unseal the package in one operation, while at the same time acting as an effective oxygen barrier.

[0014] In the solutions described in Patent Applications WO 95/05996 and EP-A-1088764 and EP 1262412, upon which the preamble of claim 1 is based, opening devices of this type substantially comprise a frame defined by a cylindrical collar defining a pour opening, and by a base flange fitted about a pierceable portion of the package; a removable cap which screws onto the outside of the collar of the frame to close the opening; and a substantially tubular cutting member, which screws inside the collar of the frame, and comprises, at one end, a cutting edge with one or more end teeth which cooperate with the pierceable portion of the package to detach it incompletely from the relative wall, i.e. all except a small-angle portion.

[0015] The cap is normally molded integrally with a relative tamperproof ring connected coaxially to the cap by breakable radial connecting spots.

[0016] The cap described is pressed onto the frame

so that the relative tamperproof ring clicks past the thread portion of the frame close to the base flange.

[0017] The cutting member is operated by the cap by means of ratchet-type one-way transmission means, which are activated when disengaging the cap from the collar. The cutting member moves in a spiral, with respect to the frame, from a raised rest position, in which its cutting edge faces the pierceable portion, to successive lowered cutting positions, in which the cutting edge interacts with the pierceable portion.

[0018] When unsealing packages of the above type, the force exerted by the user on the cap is therefore discontinuous and relatively annoying. More specifically, maximum force is required at the start of the unsealing stage to detach the tamperproof ring from the cap; considerably less force is required at the subsequent rotation stage, in which, on account of the inevitable axial clearance between the cap and frame threads, the cap substantially rotates freely or "idly"; and maximum force is again required to initiate shearing of the pierceable portion by the cutting member.

[0019] In other words, when unsealing the package, the user experiences two successive force peaks separated by a substantially free rotation stage, the effect of which is fairly annoying. That is, after the first force peak, the user is given the impression the package is unsealed, only to be called up to exert additional effort to actually complete the operation.

[0020] Moreover, to store the finished packages and reduce the amount of plastic employed, the height of the opening devices applied to the packages is kept as low as possible.

[0021] This is currently done using multistart cap and frame threads, which also assist the user in opening and closing the package. That is, whereas single-start solutions require a full turn or slightly more of the cap, long-pitch multistart threads enable the cap to be removed completely, or fully tightened, by turning it roughly 180°.

[0022] Short opening devices with multistart threads, however, are unsuitable for packages containing fizzy drinks, on account of the long-pitch threaded connection failing to adequately retain the cap in opposition to the pressure produced inside the package by the gas in the product.

[0023] The gas in the product could therefore cause the cap to be blown off the package when the pierceable portion is sheared.

[0024] It is an object of the present invention to provide a reclosable opening device for sealed packages of pourable food products, designed to eliminate the aforementioned drawbacks typically associated with known opening devices.

[0025] According to the present invention, there is provided a reclosable opening device for sealed packages of pourable food products, as claimed in Claim 1.

[0026] Two preferred, non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective of a top portion of a sealed package for pourable food products, fitted with a reclosable opening device in accordance with the teachings of the present invention;

Figure 2 shows a larger-scale exploded side view of the Figure 1 opening device before it is applied to the relative package;

Figure 3 shows a larger-scale underside view in perspective of a cap of the Figure 1 opening device;

Figures 4 and 5 show larger-scale axial sections of the Figure 1 opening device fitted to the relative package and in two different operating configurations;

Figure 6 shows a section along line VI-VI in Figure 4;

Figure 7 shows a larger-scale detail of an externally threaded frame of the Figure 5 opening device, in which portions of the frame thread engaging respective portions of the cap thread are sectioned along the centrelines;

Figure 8 is similar to Figure 4, and shows an alternative embodiment of an opening device in accordance with the present invention;

Figure 9 shows the same view as in Figure 7, of the Figure 8 opening device.

[0027] Number 1 in Figure 1 indicates as a whole an aseptic sealed package for pourable food products, e.g. a parallelepiped-shaped package known as Tetra Brik Aseptic (registered trademark), which is made from sheet packaging material, as described previously in detail, and is fitted with a reclosable opening device 2 made of plastic material and applied to package 1 in conventional manner, e.g. using adhesives or microflame or laser sealing methods.

[0028] The packaging material has a multilayer structure, and comprises, at a top wall 3 of package 1, a circular pierceable portion 4 of axis A (Figures 2, 4 and 5), which in use is covered externally by opening device 2 and is detached at least partly from wall 3 to enable the product to be poured out of package 1.

[0029] In the example shown, the packaging material comprises a layer of fibrous material 5, normally paper, covered on the outside and inside with respective laminated sheets 6, 7 normally defined by one of more layers of heat-seal plastic material, e.g. polyethylene. When the packaging material is used for producing aseptic packages of long-storage products, such as UHT milk, the inner laminated sheet 7 also comprises a layer of barrier material interposed between the layers of heat-seal plastic material.

[0030] Pierceable portion 4 is defined in this case by respective portions of outer and inner laminated sheets 6, 7 covering a hole 8, of axis A, formed in the layer of fibrous material 5.

[0031] When there is no layer of barrier material, e.g. in the case of non-aseptic packages of pasteurized products (e.g. yoghurt, cream, and other cold-storage products), the pierceable portion is defined by a preferential tear line (not shown) formed in the layer of fibrous mate-

rial and defined by a succession of perforations. One example of this solution is described in Patent Application EP-A-1088764, the content of which is considered included herein by way of reference.

[0032] With reference to Figures 1 to 6, opening device 2 comprises a frame 10 defining a through hole 11 of axis A, through which the food product is poured, and fixed to wall 3 of package 1, about pierceable portion 4; a cap 12 formed separately from frame 10 and fitted coaxially to frame 10 to close hole 11; and a tubular cutting member 13, of axis A, which engages hole 11 in axially and angularly movable manner, and is activated by cap 12 to interact with pierceable portion 4 of wall 3 to unseal package 1.

[0033] More specifically, frame 10 comprises a circular annular base flange 14, an end surface of which is fixed to wall 3 of package 1, about pierceable portion 4, and from the radially inner edge of which projects axially a cylindrical collar 16, of axis A, defining hole 11.

[0034] On respective opposite lateral surfaces, collar 16 comprises an external thread 20 and an internal thread 21, which, in use, engage relative threads 22, 23 of cap 12 and of cutting member 13, and slope in opposite directions with respect to axis A.

[0035] On the outside, collar 16 comprises an annular rib 24 interposed axially between one end of thread 20 and flange 14, and located a constant axial distance from flange 14.

[0036] Collar 16 also has one or more lateral windows 18 for releasing any gas in the food product, and so reducing the pressure inside package 1, when cap 12 is unscrewed off frame 10 and shearing of pierceable portion 4 commences.

[0037] Cap 12 is defined by a hollow cylindrical body bounded by a circular top wall 25 for closing hole 11, and by a cylindrical lateral wall 26, which projects from a peripheral edge of top wall 25, is provided internally with thread 22, and screws onto collar 16 of frame 10.

[0038] Top wall 25 has a projecting annular rib 27 adjacent to lateral wall 26 and defining, with lateral wall 26, a seat for receiving the top end edge of collar 16.

[0039] Cap 12 is normally molded integrally with a relative tamperproof ring 28 connected coaxially to an end edge of cap 12, opposite top wall 25, by a number of breakable radial connecting spots.

[0040] Cap 12 is initially fixed to frame 10 in a sealing position, in which it is screwed completely onto collar 16, with its bottom end edge and tamperproof ring 28, still connected to each other, on opposite sides of rib 27 of collar 16 (Figure 4).

[0041] Once unsealed, cap 12 is movable between an open position, in which it is unscrewed off collar 16 and detached from frame 10, and a closed position closing hole 11. Initial rotation of cap 12, when unsealing package 1, breaks the connecting spots between cap 12 and tamperproof ring 28, which rests on base flange 14. More specifically, the connecting spots are broken by spiral rotation of cap 12 away from rib 24 of frame 10, and by rib 24 simultaneously retaining tamperproof ring 28.

[0042] With reference to Figures 2, 4, 5 and 6, cutting member 13, which has thread 23 on its outer surface, is fitted in known manner inside collar 16 of frame 10 by thread 23 engaging thread 21, and comprises an end edge 30 having face cutting means 31 - in the example shown, one cutting tooth - which cooperate with pierceable portion 4 to unseal package 1. Connection of collar 16 of frame 10 to cutting member 13, and operation of cutting member 13 by cap 12 are described below only as required for a clear understanding of the present invention. Further details can be found in Patent Application EP-A-1088764, the content of which is considered included herein by way of reference.

[0043] Threads 21 and 23 define, when unsealing package 1, a helical path, of axis A, of cutting member 13 through pierceable portion 4, from a raised rest position (Figure 4) to a bottom open position (not shown). More specifically, in the raised rest position, cutting member 13 is housed completely inside collar 16, with cutting means 31 facing pierceable portion 4; and, in the bottom open position, cutting member 13 projects axially with respect to collar 16, has penetrated a given distance inside package 1, and has completely cut pierceable portion 4, leaving it attached by a small-angle portion to wall 3.

[0044] The movement of cutting member 13 from the raised position to the bottom position is controlled by cap 12 by means of one-way angular transmission means 32 (Figures 3 and 6), which are selectively deactivated once cutting member 13 reaches the bottom open position.

[0045] More specifically, transmission means 32 comprise a number of first teeth 33 - four in the example shown - having a saw-tooth profile, projecting from top wall 25 of cap 12, and equally spaced angularly about axis A; and a number of second teeth 34 - eight in the example shown - also having a saw-tooth profile, and which project radially from an inner surface of cutting member 13, and mesh in axially free, angularly integral manner with teeth 33 along the release travel of cap 12 from collar 16 when unsealing package 1. More specifically, the release travel of cap 12 is shown in Figure 1 by anticlockwise rotation R of cap 12 about axis A.

[0046] More specifically, each tooth 33 is defined, towards lateral wall 26, by two oblique, outwardly converging sides 36, 37; the side (36) sloping more sharply, with respect to the radial direction joining relative tooth 33 to axis A, defines a stop for a relative tooth 34 in rotation direction R of cap 12; and the other side (37) allows teeth 34 to slide angularly in the opposite rotation direction.

[0047] Each tooth 34 extends the full axial height of cutting member 13, and has, in cross section, the same profile as teeth 33, defined by two oblique converging sides 38, 39; and the side (38) sloping more sharply, with respect to the radial direction joining tooth 34 to axis A, faces side 36 of a relative tooth 33.

[0048] According to an important aspect of the present invention, thread 20 of frame 10 comprises, at a portion

engaged by thread 22 of cap 12 at the transient stage between detachment of tamperproof ring 28 and initial shearing of pierceable portion 4 by cutting means 31, successive thread portions 40, 41 separated by a distance D1 smaller than the distance D of the rest of thread 20, so as to eliminate, at said portion, the clearance between threads 20 and 22. This feature enables perfect control of the rotation of cap 12 when unsealing the package, to minimize the risk of cap 12 being blown off in the case of fizzy products. Moreover, by eliminating the clearance between threads 20 and 22 at the transient stage between detachment of tamperproof ring 28 and initial shearing of pierceable portion 4, the user experiences only one prolonged force peak when unsealing the package.

[0049] In the example shown, thread 20 is a three-start type, and thread portions 40, 41 form part of independent threads.

[0050] In an alternative embodiment not shown, thread 20 may be a single-start type, and thread portions 40, 41 may be defined by spaced, facing portions of the same thread.

[0051] The distance between thread portions 40, 41 is reduced to D1 by altering the course of one (40) of the two thread portions so that it converges towards the other (41).

[0052] Number 2' in Figures 8 and 9 indicates as a whole a different embodiment of an opening device in accordance with the teachings of the present invention, and which is described below only insofar as it differs from opening device 2, and using the same reference numbers for component parts corresponding or equivalent to those already described.

[0053] Opening device 2' differs from opening device 2 by the distance between thread portions 40 and 41 being reduced to D1 by shaping one (40) of the two thread portions to bring it closer to the other (41). More specifically, thread portion 40 defines a projection 42 projecting towards the adjacent thread portion 41.

[0054] Opening device 2, 2' is assembled, before being fixed to pierceable portion 4 of package 1, by inserting cutting member 13 in a predetermined angular position inside collar 16, and by simultaneously or subsequently fitting cap 12 to frame 10.

[0055] More specifically, when inserting cutting member 13 inside collar 16, threads 21 and 23 engage one another, and teeth 34 slide axially in pairs on opposite angular sides of sides 36, 37 of a relative tooth 33.

[0056] Cap 12 is preferably pressed axially onto frame 10, after first positioning cap 12 in a predetermined angular position with respect to cutting member 13. At this stage, threads 20 and 22 engage one another, and tamperproof ring 28 clicks past annular rib 24 of collar 16 towards flange 14. Alternatively, cap 12 may be pressed axially onto the frame and then screwed on collar 16 of frame 10 into a final angular position enabling full use of the screw-off travel of cap 12 when unsealing package 1.

[0057] At the end of the above operations cutting member 13 is in the raised rest position inside collar 16, and defines, together with cap 12 closing hole 11, a sealed configuration of opening device 2, 2' on package 1 (Figures 4, 8).

[0058] In actual use, starting from said sealed configuration, package 1 is unsealed by rotating cap 12 in direction R with respect to axis A to unscrew it off collar 16.

[0059] As cap 12 is rotated in direction R about axis A, the engagement of threads 20 and 22 simultaneously moves cap 12 axially away from wall 3, thus breaking the radial spots connecting it to tamperproof ring 28, which is retained resting axially on rib 24 of collar 16.

[0060] Once tamperproof ring 28 is detached, part of thread 22 of cap 12 slides between thread portions 40 and 41 of collar 16 separated by a smaller axial distance (D1), so that the movement of cap 12 is guided perfectly at this stage.

[0061] Teeth 33 of cap 12 are positioned with sides 36 resting against sides 38 of relative teeth 34 of cutting member 13, which is thus also rotated about axis A in direction R.

[0062] Given the opposite inclination of mutually engaging pairs of threads 20, 22 and 21, 23, the axial movement of cap 12 away from wall 3 of package 1 corresponds to a simultaneous axial movement of cutting member 13 towards wall 3. More specifically, cutting member 13 is rotated by cap 12 by teeth 33 and 34 contacting at respective sides 36, 38, which are simultaneously slid axially with respect to each other by the spiral movement impressed on cap 12 and cutting member 13 by relative pairs of threads 20, 22 and 21, 23.

[0063] The initial rotation of cap 12 about axis A in direction R produces an equal rotation of cutting member 13 and, simultaneously, axial penetration of pierceable portion 4 by cutting means 31 (Figure 5).

[0064] At the transient stage between detachment of tamperproof ring 28 and initial shearing of pierceable portion 4 by cutting means 31, relatively strong force must still be exerted by the user on cap 12 to continue the unsealing action and overcome the resistance encountered by thread 22 on passing through the constriction between thread portions 40 and 41 of collar 16.

[0065] At this stage, any gas in the food product is released through window/s 18 to rapidly reduce the pressure exerted on tap 12 from inside package 1.

[0066] Once the constriction is overcome, and following initial penetration of pierceable portion 4 by cutting means 31 and release of any gas in the food product, the normal axial clearance is restored between threads 20 and 22, which therefore slide more freely.

[0067] Cutting means 31 advance angularly through pierceable portion 4 to detach it along its perimeter from wall 3.

[0068] Unsealing is completed by axial disengagement of teeth 33 and 34, followed by complete removal of cap 12 from collar 16 to free pour hole 11.

[0069] Once package 1 is unsealed, cutting member

13 is prevented from moving from the bottom open position, by teeth 33 of cap 12 being unable to reach an axial position engaging teeth 34 of cutting member 13. In which position, the sheared portion of pierceable portion 4 is retained inside cutting member 13 to keep hole 11 clear.

[0070] Package 1 is closed by simply replacing cap 12 on collar 16.

[0071] The advantages of opening devices 2, 2' according to the present invention will be clear from the foregoing description.

[0072] In particular, as stated, eliminating the clearance between threads 20 and 22 at the transient stage between detachment of tamperproof ring 28 and initial shearing of pierceable portion 4 permits optimum control of the rotation of cap 12 at the most delicate stage, i.e. when unsealing package 1, thus minimizing the risk of cap 12 being blown off in the case of gas-containing products. In which case, window/s 18 in collar 16 of frame 10 permits/permit fast release of the gas to rapidly reduce the pressure exerted on cap 12 from inside package 1, and to restore the normal axial clearance between threads 20 and 22 at the following unsealing stage, with no risk of sudden detachment of cap 12.

[0073] Moreover, by virtue of the above feature of threads 20 and 22, the user, when unsealing package 1, experiences a single prolonged force peak, as opposed to two successive force peaks typical of known opening devices. In other words, the annoying sensation of discontinuity when unsealing the package is eliminated.

[0074] Clearly, changes may be made to opening devices 2, 2' as described and illustrated herein without, however, departing from the scope of the accompanying Claims.

Claims

1. A reclosable opening device (2, 2') for a sealed sheet package (1) of a pourable food product, said device (2, 2') comprising:

   - a frame (10) defining a pour opening (11), fitted about a pierceable portion (4) of said package (1), and having at least one first thread (20);
   - a removable cap (12) having a second thread (22) which engages said first thread (20) to screw the cap (12) onto said frame (10) to close said pour opening (11);
   - tamperproof means (28) connected to said cap (12) by breakable connecting means (29) and detachable from said cap (12) upon first rotation of the cap; and
   - cutting means (13, 31) controlled by said cap (12), and which, following breakage of said breakable connecting means (29), shear said pierceable portion (4) to unseal said package (1);

   characterized in that one (20) of said threads (20, 22) comprises, at a portion engaged by the other (22) of said threads (20, 22) at the transient stage between detachment of said tamperproof means (28) and initial shearing of said pierceable portion (4) by said cutting means (13, 31), successive thread portions (40, 41) separated by a distance (D1) smaller than the distance (D) of the rest of said one (20) of said threads (20, 22), so as to eliminate the clearance between the threads (20, 22) at said portion.

2. A device as claimed in Claim 1, **characterized in that** the course of one (40) of said thread portions (40, 41) is altered so that it converges towards the other said thread portion (41).

3. A device as claimed in Claim 1, **characterized in that** one (40) of said thread portions (40, 41) defines a projection (42) projecting towards the other said thread portion (41).

4. A device as claimed in any one of the foregoing Claims, **characterized in that** said thread portions (40, 41) form part of independent threads.

5. A device as claimed in any one of the foregoing Claims, **characterized in that** said thread portions (40, 41) form part of the same thread (20).

6. A device as claimed in any one of the foregoing Claims, **characterized in that** said cutting means comprise a tubular cutting member (13) engaging said pour opening (11) in angularly and axially movable manner, connected angularly to said cap (12) at least along a release travel of the cap (12) from said frame (10) when unsealing said package (1), and having at least one end cutting tooth (31);connecting means (21, 23) being provided between said frame (10) and said cutting member (13) to define a spiral path of the cutting member (13) through said pierceable portion (4).

7. A device as claimed in any one of the foregoing Claims, **characterized in that** said frame (10) has at least one lateral window (18) for assisting release of any gas in the food product as said cap (12) is unscrewed off the frame (10) and upon initial shearing of said pierceable portion (4) by said cutting means (13).

Patentansprüche

1. Wiederverschließbare Öffnungsvorrichtung (2, 2') für eine versiegelte Folienpackung (1) für ausgießbare Nahrungsmittel, die Vorrichtung (2, 2') umfasst:

einen Rahmen (10), der eine Ausgießöffnung (11) definiert, der in einen durchstechbaren Teil (4) der Packung (1) eingepasst ist und der wenigstens ein erstes Gewinde (20) aufweist,
eine ablösbare Verschlusskappe (12) mit einem zweiten Gewinde (22), das in das erste Gewinde (20) eingreift, um die Verschlusskappe (12) auf den Rahmen (10) zu schrauben, um die Ausgießöffnung (11) zu schließen,
manipulationssichere Mittel (28), durch brechbare Verbindungsmittel (29) mit der Verschlusskappe (12) verbunden und von der Verschlusskappe (12) nach erster Drehung der Verschlusskappe lösbar, und
Schneidmittel (13, 31), die durch die Verschlusskappe (12) geführt werden und die, im Anschluss an das Zerbrechen der zerbrechbaren Verbindungsmittel (29), den durchstechbaren Teil (4) der Packung (1) abscheren, um die Pakkung 1 zu entsiegeln,

dadurch gekennzeichnet, dass eines (20) der Gewinde (20, 22) an einem Teil, in den durch das andere (22) der Gewinde (20, 22), in der Übergangsphase zwischen dem Ablösen der manipulationssicheren Mittel (28) und dem anfänglichen Abscheren des durchstechbaren Teils (4) durch die Schneidmittel (13, 31), eingegriffen wird, aufeinanderfolgende Gewindeteile (40, 41) umfasst, die durch einen Abstand (D1), der kleiner als der Abstand der restlichen des einen (20) der Gewinde (20, 22) ist, getrennt sind, um so das Spiel zwischen den Gewinden (20, 22) und dem Teil zu eliminieren.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Richtung eines (40) der Gewindeteile (40, 41) so geändert ist, dass er sich dem anderen Gewindeteil (41) nähert.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** einer (40) der Gewindeteile (40, 41) einen Vorsprung (42) definiert, der in Richtung auf den anderen der Gewindeteile (41) vorsteht.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Gewindeteile (40, 41) zu den eigenständigen Gewinden gehören.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Gewindeteile (40, 41) zu demselben Gewinde (20) gehören.

6. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schneidmittel ein rohrförmiges Schneidelement (13) umfassen, das in die Ausgießöffnung (11) in einer winkligen und axial beweglichen Art und Weise eingreift, beim Entsiegeln der Packung (1) wenigstens entlang einem Freigabeweg der Verschlusskappe (12) von den Rahmen (10) mit der Verschlusskappe (12) drehverbunden ist und wenigstens einen Endschneidzahn aufweist und die Verbindungsmittel (21, 23) zwischen dem Rahmen (10) und dem Schneidelement (13) bereitgestellt sind, um einen Spiralweg des Schneidelementes (13) durch den durchstechbaren Teil (4) zu definieren.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Rahmen (10) wenigstens ein Seitenfenster (18) hat, um das Freisetzen von jeglichem Gas aus dem Nahrungsmittel, während die Verschlusskappe (12) von dem Rahmen (10) abgeschraubt wird und bei dem anfänglichen Abscheren des durchstechbaren Teils (4) durch die Schneidmittel (13), zu unterstützen.

Revendications

1. Dispositif d'ouverture refermable (2, 2') pour un emballage en feuille scellé d'un produit alimentaire versable, le dit dispositif (2, 2') comprenant :

une base (10) définissant un orifice de versage (11), fixée autour d'une partie perçable (4) du dit emballage (1) et comportant au moins un premier filetage (20) ;
un bouchon amovible (12) comportant un deuxième filetage (22) qui s'accouple au dit premier filetage (20) pour visser le bouchon (12) sur la dite base (10) de manière à fermer le dit orifice de versage (11) ;
un élément anti-violation (28) relié au dit bouchon (12) par des moyens de liaison cassables (29), et détachable du dit bouchon (12) lors d'une première rotation du bouchon ; et
des moyens de coupe (13, 31) commandés par le dit bouchon (12) et qui, après cassure des dits moyens de liaison cassables (29), cisaillent la dite partie perçable (4) pour ouvrir le dit emballage (1) ;

caractérisé en ce qu'un (20) des dits filetages (20, 22) comprend, dans une partie en prise avec l'autre (22) des dits filetages (20, 22) au stade transitoire entre le détachement du dit élément anti-violation (28) et le cisaillement initial de la dite partie perçable (4) par les dits moyens de coupe (13, 31), des parties de filetage successives (40, 41) séparées par une distance (D1) plus petite que la distance (D) du reste du dit un (20) des dits filetages (20, 22), de façon à éliminer le jeu entre les filetages (20, 22) dans la dite partie.

2. Dispositif selon la revendication 1, **caractérisé en ce que** le cours d'une (40) des dites parties de filetage (40, 41) est modifié de sorte qu'elle converge vers la dite autre partie de filetage (41).

3. Dispositif selon la revendication 1, **caractérisé en ce qu'**une (40) des dites parties de filetage (40, 41) définit une saillie (42) s'étendant vers la dite autre partie de filetage (41).

4. Dispositif selon une quelconque des revendications précédentes, **caractérisé en ce que** les dites parties de filetage (40, 41) font partie de filetages indépendants.

5. Dispositif selon une quelconque des revendications précédentes, **caractérisé en ce que** les dites parties de filetage (40, 41) font partie du même filetage (20).

6. Dispositif selon une quelconque des revendications précédentes, **caractérisé en ce que** les dits moyens de coupe comprennent un élément de coupe tubulaire (13) attaquant le dit orifice de versage (11) d'une manière angulairement et axialement mobile, relié angulairement au dit bouchon (12) au moins le long d'une course de libération du bouchon (12) par rapport à la dite base (10) lorsqu'on ouvre le dit emballage (1), et comportant au moins une dent de coupe d'extrémité (31) ; des moyens de liaison (21, 23) étant prévus entre la dite base (10) et le dit élément de coupe (13) pour définir un chemin hélicoïdal de l'élément de coupe (13) à travers la dite partie perçable (4).

7. Dispositif selon une quelconque des revendications précédentes, **caractérisé en ce que** la dite base (10) comporte au moins une fenêtre latérale (18) pour faciliter le dégagement de gaz du produit alimentaire lorsque le dit bouchon (12) est dévissé de la base (10), et lors du cisaillement initial de la dite partie perçable (4) par les dits moyens de coupe (13).

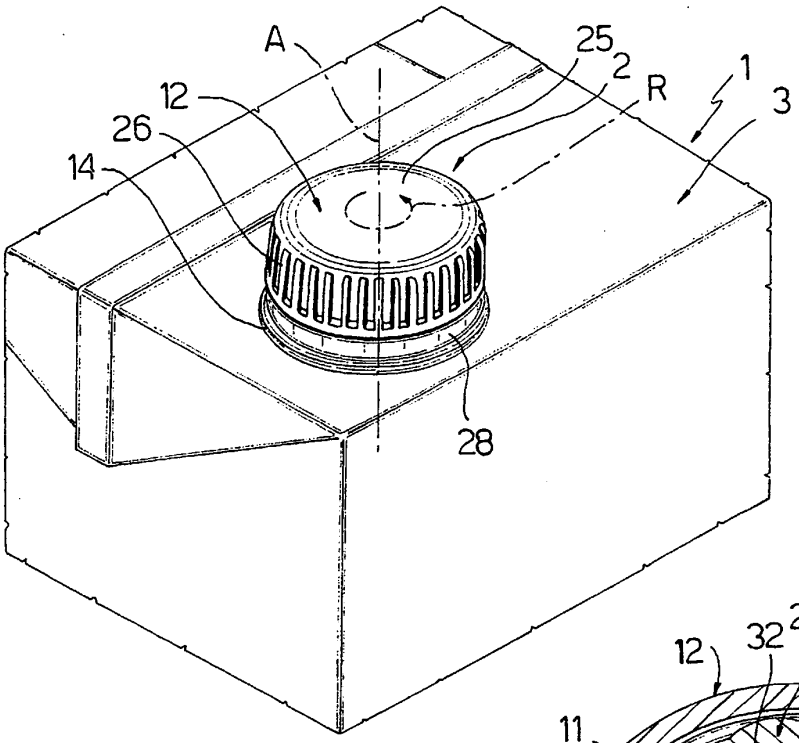


Fig.1

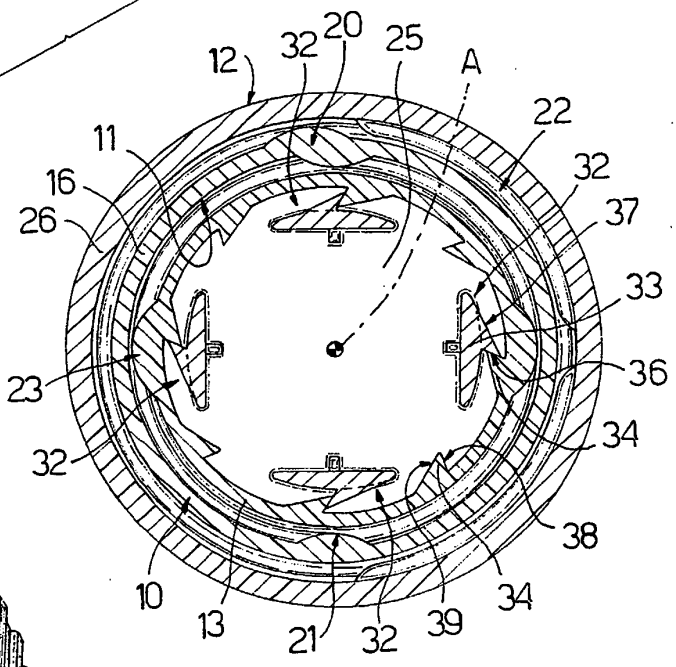


Fig.6

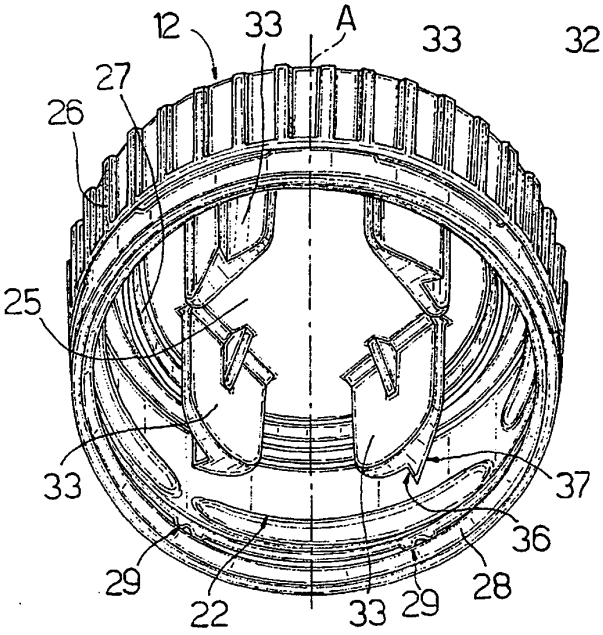


Fig.3

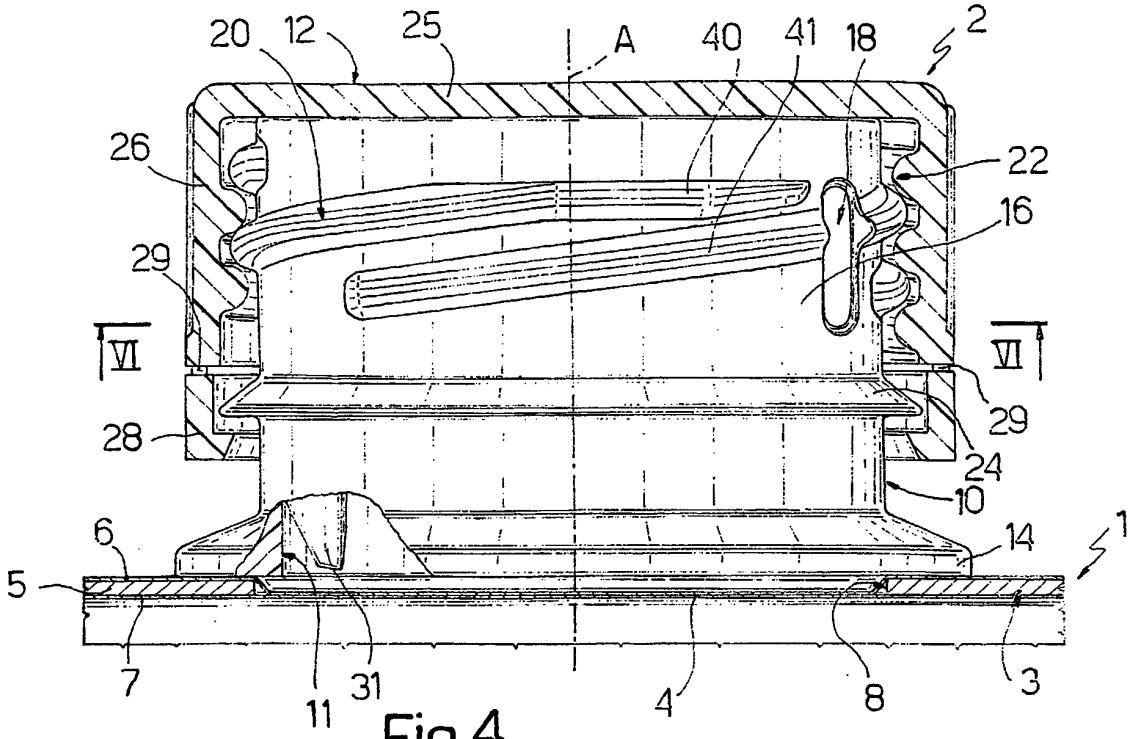
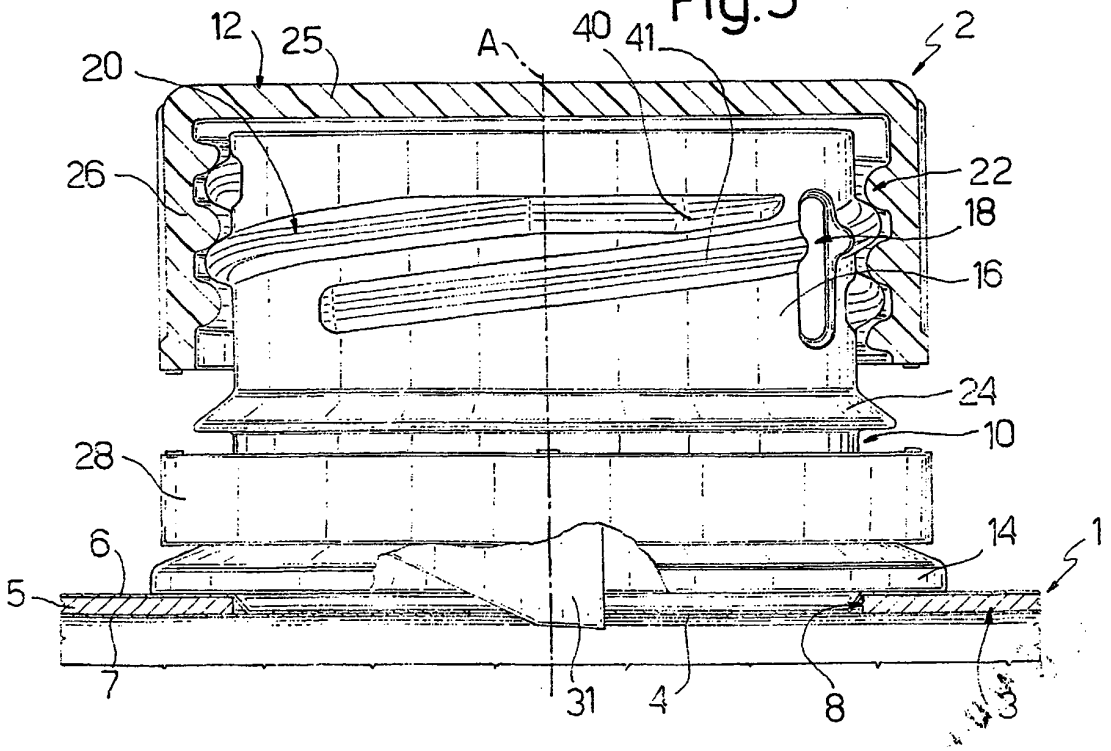

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Fig.4

Fig.5


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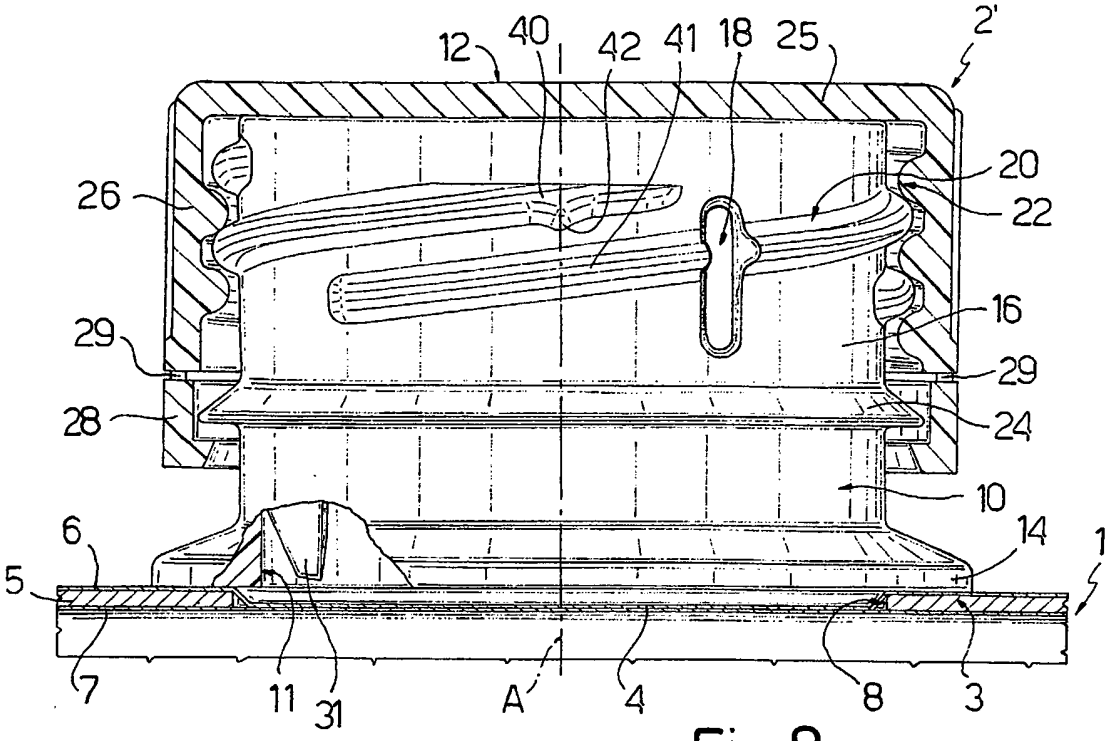

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Fig.8

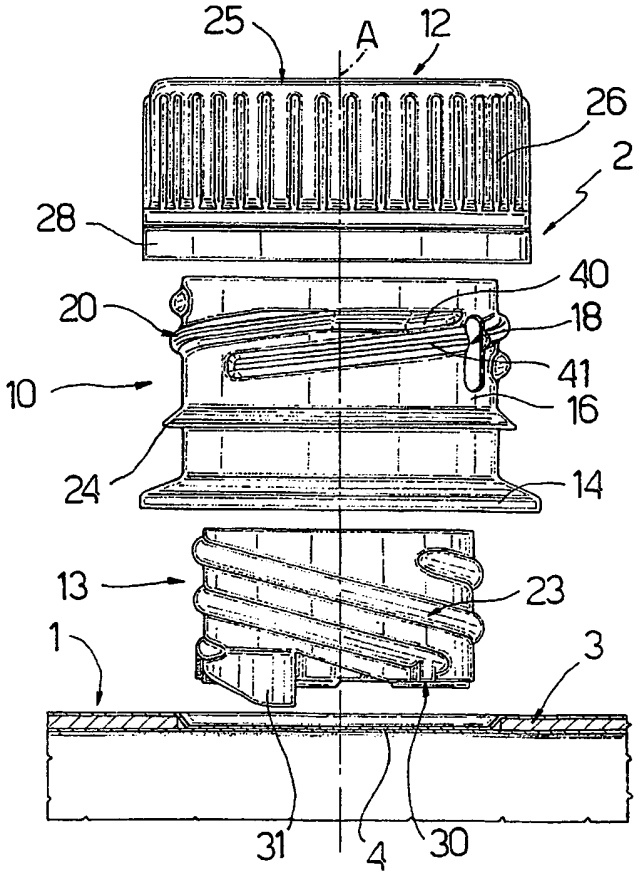

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Fig.2

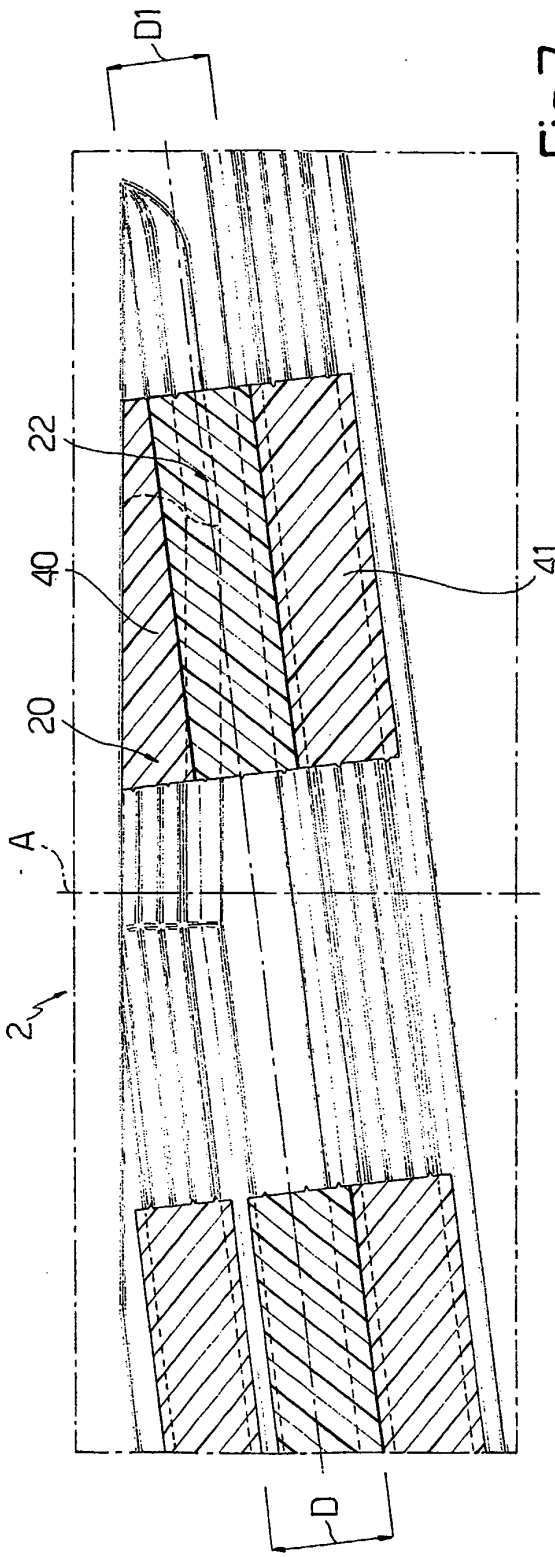


Fig.7

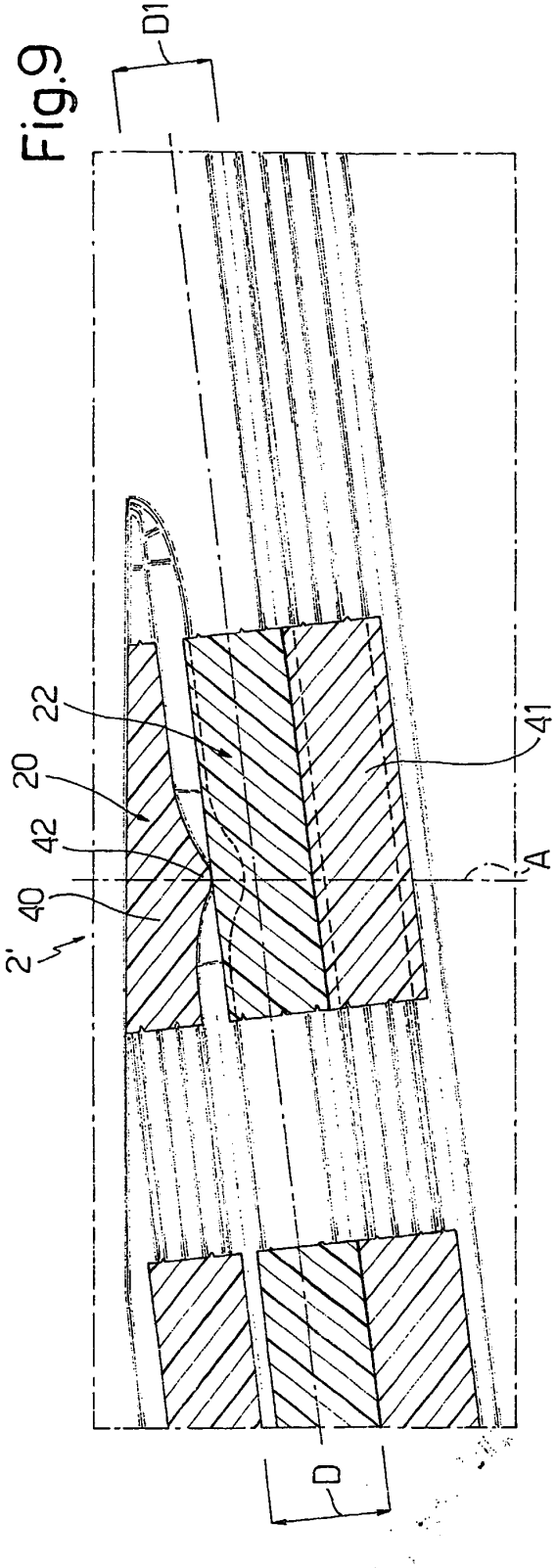


Fig.9