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(54) **tamper-evident closure for bottles**

Originalitätsverschluss für Flaschen

Fermeture inviolable pour bouteilles

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EP 1 526 086 B1

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Description

[0001] The present invention relates to safety stoppers for bottles which afford substantial advantages over currently known stoppers, in particular functional advantages and advantages in terms of stopper production.

[0002] EP-A-807585 (GRUPO STEVI) discloses a safety stopper of the kind described in the preamble of claim 1, in which the over-cap is a non-breakable over-cap with a removable sealing band, provided with vertical ribs which fit between corresponding vertical ribs of the upper cap so that both parts turn together, and with a lower horizontal ring comprising a series of braids which fit corresponding braids on the upper cap to prevent separation of the two parts.

[0003] NL-C-1016994 (GUALA CLOSURES PATENTS B V) also discloses a safety stopper of the kind described in the preamble of claim 1. In this case, the over-cap is an engaging metal over-cap which is fixed to the outside of the cap-tube assembly via cooperating axial and peripheral ribs and grooves which are provided for that purpose on the upper cap and the lower tubular component.

[0004] A main object of the present invention is to provide a new concept of modularity in safety stoppers for bottles, by the use of which, owing to the specific design characteristics provided by the present invention, it is possible to produce a wide range of safety stoppers based on the same essential basic components by merely introducing a few specific variations therein.

[0005] Starting with the same external component, commonly known as a tubular cap or "cap-tube", the present invention basically provides numerous variations of the safety stopper which are intended to satisfy different requirements by incorporating, in the same external tubular cap, various over-caps which provide safety stoppers with a tamper evident safety sealing strip of the type which has a seal which may be detached when opening the stopper and of the tear type and similarly stoppers with an external finish comprising an aluminium covering. These variations of stoppers can also incorporate two types of internal or "ring-type" sealing component with or without a crystal ball, and this increases the range of safety stoppers.

[0006] In accordance with the present improvements, therefore, the modularity of the present invention enables various types of safety stopper intended to fulfill different market requirements to be achieved through minor constructional variations, such as:

Safety stopper with tear seal. These safety stoppers necessitate the complete breakage of the over-cap to allow unscrewing of the cap and subsequent emptying of the bottle. This version is the safest, as it is the most difficult to cheat. It is a safety stopper especially intended for industries in which there is traditionally a high incidence of cheating.

Safety stopper with a tear seal at the stopper orifice.

This is a safety stopper with a removable sealing strip which also has high safety characteristics allowing any tampering to be monitored. This type of safety stopper is suitable for products in which the incidence of cheating is not as high as in the aforementioned case. Although the removable seal has a high safety level, incidences of tampering can occur, in extreme cases, more easily than in the aforementioned case.

Safety stopper with metal covering. This is a safety stopper in which the over-cap is made of metal, for example of aluminium, and constitutes a crimped metal component with fine walls which is superimposed on the detachable cap of the stopper and gives the assembly formed by the safety stopper and the actual bottle an aesthetic appearance. It is a stopper which is particularly appropriate in cases where the aforementioned aesthetic characteristics are to be particularly promoted.

[0007] Each of the aforementioned three main variations may be combined with an internal seal with or without a ball, and this increases the range of possibilities for producing safety stoppers according to the present invention.

[0008] In particular, the improvements according to the present invention are intended to afford production advantages and functional advantages.

[0009] The production advantages include the smaller number of different moulds required to produce an entire range of safety stoppers and this is due to the characteristic of modularity of the present invention.

[0010] The necessary stocks of parts are at the same time reduced because the specific versions of parts are reduced and those which are common to the different designs provided are increased. This similarly represents a significant advantage with regard to production planning.

[0011] Similarly, assembly of different caps in the same bottle packaging and closure lines is considerably facilitated.

[0012] The present improvements similarly afford numerous significant functional advantages including:

difficulty in extracting the body of the safety stopper owing to the large strong area of the cap-tube, which affords greater safety.

[0013] The greater strength of the corresponding region of the tubular cap or cap-tube allows the production of cutting teeth on the body of the stopper, which do not have to correspond to the teeth of the tubular cap, as in embodiments of safety stoppers belonging to the state of the art, so errors in tip-to-tip assembly between teeth are avoided.

[0014] Faster pouring of the liquid in the bottle provided with a safety stopper according to the present improvements is also permitted by the greater open area of the

intermediate body or "hoop".

[0015] In the versions with a removable band, the sealing strip may be detached, whatever the opening direction of the cap.

[0016] A further embodiment of the invention increases the versatility thereof by allowing the production of disposable stoppers for bottles which combine an external metal cover with an intermediate part moulded from synthetic material intended to engage with external ribs of the upper portion of the cap-tube and provided with external ribs for the press fit of the metal cover and which optionally has a sealing strip at the bottom which may be broken at the moment of opening, thus constituting a means for checking for possible tampering, in other words what is known in this industry as a "tamper evident" device. The metal cover may be longer if there is no "tamper evident" sealing strip, and covers the depth corresponding to said component.

[0017] The accompanying exemplary, non-limiting drawings of embodiments of the present invention will assist the understanding thereof.

[0018] Fig. 1 to 10 show a version of the type known as a tearable over-cap with the following detail.

[0019] Fig. 1 is a partial section of a safety stopper in accordance with the present invention.

[0020] Fig. 1A is a cross section.

[0021] Fig. 2 is a side elevation of the safety stopper according to Fig. 1.

[0022] Fig. 3 and 4 are views equivalent to Fig. 1 and 2 through planes at 90° to the planes in those figures.

[0023] Fig. 5 and 6 correspond to Fig. 1 and 2 in a second embodiment of the over-cap, without lateral windows.

[0024] Fig. 7, 7A and 8 are views similar to those in Fig. 1, 1A and 2, corresponding to the over-cap of Fig. 5 and 6.

[0025] Fig. 9 and 10 are a partial section with the safety stopper fitted and the same partial section with the cap detached once the over-cap from Fig. 1 to 8 has been withdrawn.

[0026] Fig. 11 and 12 show an elevation and a perspective view of the body of the safety stopper respectively, illustrating the anti-twist device between cap-tube and body.

[0027] Fig. 13 to 18 correspond to the version of safety stopper with a sealing strip which may be detached when it is opened, according to the following detail.

[0028] Fig. 13 is an elevation and a partial section of a safety stopper, as fitted, in accordance with the present invention.

[0029] Fig. 13A is a cross section.

[0030] Fig. 14 is a cross-section through the sectional plane shown in Fig. 13.

[0031] Fig. 15 is a view of the safety stopper with the cap during assembly.

[0032] Fig. 16 is a perspective view of the corresponding cap-tube.

[0033] Fig. 17 is a perspective view with the cap de-

tached after breakage of the sealing strip.

[0034] Fig. 18 is a section similar to that in Fig. 13 with a ball seal.

[0035] Fig. 19 to 21 correspond to the version of metal over-cap according to the following detail.

[0036] Fig. 19 is a front elevation and a partial section of a safety stopper according to the present invention with a metal over-cap.

[0037] Fig. 20 is a view corresponding to Fig. 19 with the cap detached and partially in section.

[0038] Fig. 21 is a view similar to Fig. 20 showing an illustration of the metal over-cap detached from the cap.

[0039] As shown in the figures, the improvements according to the present invention allow the production of a tubular cap assembly formed by the external tubular component 1 intended to be fitted on a portion of the bottle neck and by the upper cap 2 which is joined to the remainder of the cap-tube in the conventional manner by a weakened line 3 and is topped by the over-cap 4 of which the lower rim 5 faces a straight step 6 of the cap-tube 1. In the version illustrated, the over-cap 4 will be removable and is broken to allow opening of the cap 2. This represents the greater safety level since, to open the safety stopper, it is necessary to break the over-cap and this reveals any tampering which has occurred.

[0040] The over-cap 4 is held on the cap 2 by the disposition of several successive segments of internal peripheral ribs 7 on the internal face of the over-cap 4 which engage below the external rib 8 on the lower portion of the cap 2.

[0041] The safety stopper incorporating the present improvements comprises the so-called hoop 9 with a substantially cylindrical single collar 10 intended to be fitted in the interior of the bottle neck, collar 10 having fine walls and a large-diameter orifice which combines with the internal sealing component 11 having a general structure in the form of a truncated cone which is open downwards to provide a large-diameter closure region 12 which fits directly on the start of the single cylindrical neck 10, thus providing a greater passage cross-section. Said hoop 9 also comprises a flange 9" which receives the flange 20 of the stopper body 18 which also abuts against the internal step 1' of the tubular component 1 of the cap-tube assembly 1, 2.

[0042] The over-cap 4 has a variable number of orifices, such as 13 and 14, which reduce the weight of the part, allow direct observation of the external or peripheral portion 15 of the cap 2 and allow improvements to moulding.

[0043] In the version shown in Fig. 5 to 8, the over-cap, indicated by reference numeral 16, is externally smooth with a variable number and disposition of weakened lines, such as 17, 17', 17", which allow said over-cap to be removed prior to opening of the safety stopper. The over-cap 16 has internal components which are common to those in the earlier figures.

[0044] Fig. 10 shows the portion of the cap 2 of the so-called cap-tube which has been removed from the body

18 and the tubular portion 1 to illustrate the seal or valve 11, hoop 9 and counter cap or body 18, which is shown in greater detail in Fig. 11 and 12.

[0045] The non-twist immobilisation of said body 18 relative to the tubular portion 1 of the cap-tube is achieved in the manner illustrated in Fig. 12, which shows that the step 19 of the lower flange 20 of the body 18, preferably the internal limiting line 21 of said step, comprises numerous projections such as those indicated by the reference numerals 22, 22', 22'', which occupy one or more circular sectors of small extension, preferably in a mutual diametrically opposed disposition. These projections 22, 22', 22'' have pointed regions and/or cutting edges so that, when the over-cap is press-fitted, said pointed and/or sharp-edged projections are partially inserted into the internal step of the live edge 23, and automatic non-twist retention thereof is effected without drawbacks such as those which occur in some state of the art embodiments comprising mating teeth, in which fitting problems can arise owing to frontal engagement of the teeth, in addition to major production problems and costs.

[0046] As mentioned above, the over-cap 4 has a lower band 24 which is joined by a tear line 24' and will be held on the cap-tube when two peripheral ribs 25 thereof engage in a groove 26 in the corresponding position of said cap-tube.

[0047] The illustrated embodiment provides a safety stopper having a greater passage cross-section to allow a greater discharge of liquid while at the same time providing a cap-tube which may be fixed directly to the lower flange of the stopper body by being pushed directly into the step projections thereof and which also has means for retention both of the over-cap via the mating disposition of ribs and of the lower band of said over-cap abutting against the cap-tube and also held via a mating rib and groove. Production of the retaining ribs in the form of partial sectors on the over-cap facilitates demoulding of the part and greatly simplifies production thereof.

[0048] Fig. 13 to 17 show an embodiment of the safety stopper with a sealing strip which is detached on opening. It can be seen that the cap-tube made up of the tubular component 1 and the cap 2 is common to the above-described embodiments but, in this case, receives an over-cap 37 which is held by ribs 37'' mating with the rib 8 of the cap 2. In this case, the stopper has an automatically removable sealing band 28 which is joined by a tear line 27 to the over-cap 37 and which, internally, has numerous longitudinal internal ribs indicated by reference numerals 29, 29', 29'', which preferably have an inclined flank structure, for example a form similar to the known dovetail, and are capable of stopping the twist of the over-cap with numerous ribs disposed at the periphery of the cap-tube step, as indicated by reference numerals 30, 30', 30'' of the peripheral cap-tube step, so that, when the over-cap is twisted in any direction, the forces on said band 28 automatically cause the breakage thereof, as shown schematically in Fig. 17, in which said band 28 has been broken into two or more portions 28'

and 28''. Continuation of unscrewing of the over-cap will allow opening of the bottle, and detachment of the seal 28 will reveal tampering with said safety stopper.

[0049] In this embodiment, the projections 30, 30', 30'' are preferably distributed in two mutually symmetrical semicircular regions, but with the ribs having variable inclinations to allow demoulding of the part in two halves. Said ribs preferably have flanks which are substantially parallel to the diametral plane of symmetry.

[0050] Fig. 18 shows an embodiment of the safety stopper with a ball seal which is indicated by reference numeral 31. In this case, said ball is disposed on an extension 32 of the hoop, the other components being similar to those already described.

[0051] Fig. 19 to 21 show the disposition of a metal over-cap 33 which completely surrounds the portion of the cap 2 of the cap-tube assembly formed by the lateral tubular component and cap 2. Said over-cap 33 comprises a lower rim 34 which coincides, when fitted, to a peripheral step 6 of the cap-tube and has a rib 35, produced by crimping, which is held on the projecting rib 8 of the cap 2. A row of external reliefs 36, 36', 36'' engage with the external rib of the cap 2, indicated by reference numeral 37' in Fig. 1 to 4, and rotationally connect the two components 33 and 2 so that, when detached, they are separated as a single component.

[0052] It is shown from the foregoing description, that the present invention allows the production of a range of safety stoppers of modular form with a single cap-tube to allow adaptation of tearable versions, of automatically detached sealing strip and of metal over-caps, with a minimum of moulds for the production thereof and with great functional effectiveness.

[0053] Although the present invention has been described with respect to specific embodiments, these are non-limiting and, furthermore, a person skilled in the art, after giving access to the disclosure of the present description, claims and drawings, can introduce numerous variations to the subject of the present invention which are included in the scope thereof, providing that they are contained within the scope of the following claims.

Claims

1. Safety stopper for bottles, comprising a hoop-shaped part (9) adapted to fit the upper rim of a bottle neck and a region of the internal portion of the orifice thereof, a displaceable seal or valve (11) mating said hoop shaped part (9), a stopper body (18) received by said hoop shaped part (9), a cap-tube assembly formed by an upper cap (2), which is screw-fitted to said stopper body (18), and a lower tubular component (1), which is joined to said upper cap (2) by a weakened line (3) and which fits on the exterior of the bottle neck, said safety stopper also comprising an over-cap (4, 16, 37, 33) externally covering said upper cap (2), said upper cap (2) being provided, on

its external surface, with a peripheral rib (8) located on the lower portion of said upper cap (2) and a plurality of longitudinal ribs (37') extending above said peripheral rib (8), **characterised by** the following configuration, of said cap-tube assembly, which makes it suitable for optionally receiving one of a breakable over-cap (4, 16), a non-breakable over-cap (37) with a removable sealing band (28) or an engaging metal over-cap (33): said tubular component (1) being provided, on its upper portion, with an internal smooth step (23), an external peripheral groove (26), a plurality of external longitudinal ribs (30, 30', 30'') extending above said peripheral groove (26) and a peripheral straight step (6) located below said external peripheral groove (26); further **characterized in that** numerous projections (22, 22', 22'') provided on a step (19) formed by a lower flange (20) of said stopper body (18) are press fitted into said internal smooth step (23) of the tubular component (1), thus performing a non-twist retention.

2. Safety stopper according to claim 1, **characterised in that** said numerous projections (22, 22', 22'') are arranged on the internal limiting line (21) of said step (19) formed by the lower flange (20) of the stopper body (18).
3. Safety stopper according to any of claims 1 to 2, **characterised in that** said numerous projections (22, 22', 22'') are arranged so as to occupy small angular sectors of the lower flange (20) of the stopper body (18).
4. Safety stopper according to claim 3, **characterised in that** said small angular sectors are disposed in a diametrically opposed disposition about the lower flange of the stopper body.
5. Safety stopper according to any of claims 1 to 4, **characterised in that** said numerous projections (22, 22', 22'') have pointed regions and/or sharp edges, so that numerous projections (22, 22', 22'') are inserted, by compression, into said smooth step (23) of the tubular component (1).
6. Safety stopper according to any of claims 1 to 5, wherein said over-cap is a breakable over-cap (4, 16), wherein said over-cap (4, 16) comprises successive segments of internal peripheral ribs (7) which engage below said external peripheral rib (8) of the lower portion of the upper cap (2), and a lower fringe (24) which is joined by a tear line (24') provided with peripheral ribs (25) which engage in said peripheral groove (26) of tubular component (1), with the lower rim (5) of said lower fringe (24) facing said peripheral straight step (6) of the tubular component (1).

7. Safety stopper according to claim 6, **characterised in that** said over-cap (4) has orifices (13, 14) allowing direct observation of the external portion (15) of said upper cap (2).
8. Safety stopper according to claim 6, **characterised in that** said over-cap (16) is externally smooth and has weakened lines (17, 17', 17'') which allow said over-cap (16) to be removed.
9. Safety stopper according to any of claims 1 to 5, wherein said over-cap is a non-breakable over-cap (37) with a removable sealing band (28), wherein said over-cap (37) comprises ribs (37'') mating with said external peripheral rib (8) of the lower portion of the upper cap (2), said removable sealing band (28) being joined to said over-cap (37) by a tear line (27) and having numerous longitudinal internal ribs (29, 29', 29'') which stop the twist of said over-cap (37) with said external longitudinal ribs (30, 30', 30'') of the tubular component (1), with the lower rim (5) of said removable sealing band (28) facing said peripheral straight step (6) of the tubular component (1).
10. Safety stopper according to any of claims 1 to 5, wherein said over-cap is an engaging metal over-cap (33), wherein said over-cap (33) has a rib (35), producing by crimping, which is held on said external peripheral rib (8) of the lower portion of the upper cap (2), and a row of external reliefs (36, 36', 36'') which engage in said longitudinal ribs (37') of the external surface of the upper cap (2), with the lower rim (34) of said over-cap (33) fitting said peripheral straight step (6) of the tubular component (1).

Patentansprüche

1. Sicherheitsverschluss für Flaschen, umfassend einen reifenförmigen Teil (9), der dazu ausgebildet ist, um den oberen Rand eines Flaschenhalses und zu einem Bereich des inneren Abschnitts seiner Öffnung zu passen, eine verschiebbare Dichtung oder ein Ventil (11), die bzw. das zu dem reifenförmigen Teil (9) passt, einen Verschlusskörper (18), der durch den reifenförmigen Teil (9) aufgenommen wird, eine Kappen-Röhren-Anordnung, die durch eine obere Kappe (2), welche an den Verschlusskörper (18) angeschraubt ist, und eine untere röhrenförmige Komponente (1), die mit der oberen Kappe (2) durch eine abgeschwächte Linie (3) verbunden ist und welche auf das Äußere des Flaschenhalses passt, gebildet wird, wobei der Sicherheitsverschluss auch eine Überkappe (4, 16, 37, 33) umfasst, die die obere Kappe (2) äußerlich abdeckt, wobei die obere Kappe (2) auf ihrer Außenfläche, mit einer peripheren Rippe (8), die auf dem unteren Ab-

schnitt der oberen Kappe (2) liegt, und mehreren länglichen Rippen (37'), die sich über der peripheren Rippe (8) erstrecken, bereitgestellt ist,

gekennzeichnet durch die folgende Gestaltung der Kappen-Röhren-Anordnung, welche sie für eine optionale Aufnahme einer von einer zerbrechlichen Überkappe (4, 16), einer unzerbrechlichen Überkappe (37) mit einem entfernbaren Versiegelungsband (28) oder einer eingreifenden Metallüberkappe (33) geeignet macht:

die röhrenförmige Komponente (1) ist an ihrem oberen Abschnitt, mit einer inneren glatten Stufe (23), einer äußeren peripheren Kerbe (26), mehreren äußeren länglichen Rippen (30, 30', 30''), die sich über der peripheren Kerbe (26) erstrecken, und einer peripheren geraden Stufe (6) versehen, die unter der externen peripheren Kerbe (26) liegt,

ferner **dadurch** gekennzeichnet, dass zahlreiche Vorsprünge (22, 22', 22''), die auf einer Stufe (19) vorgesehen sind, die **durch** einen unteren Flansch (20) des Verschlusskörpers (18) gebildet sind, druckeingepasst sind in die innere glatte Stufe (23) der röhrenförmigen Komponente (1) sind, wodurch eine nicht-verdrehte Halterung ausgeführt wird.

2. Sicherheitsverschluss nach Anspruch 1, **dadurch gekennzeichnet, dass** die zahlreichen Vorsprünge (22, 22', 22'') auf der inneren Begrenzungslinie (21) der Stufe (19) angeordnet sind, die durch den unteren Flansch (20) des Verschlusskörpers (18) gebildet ist.

3. Sicherheitsverschluss nach einem der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** die zahlreichen Vorsprünge (22, 22', 22'') so angeordnet sind, dass sie kleinwinkelige Abschnitte des unteren Flansches (20) des Verschlusskörpers (18) einnehmen.

4. Sicherheitsverschluss nach Anspruch 3, **dadurch gekennzeichnet, dass** die kleinwinkligen Bereiche in diametral entgegengesetzter Anordnung um den unteren Flansch des Verschlusskörpers angeordnet sind.

5. Sicherheitsverschluss nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die zahlreichen Vorsprünge (22, 22', 22'') spitze Regionen und/oder scharfe Kanten haben, so dass zahlreiche Vorsprünge (22, 22', 22'') durch Kompression in die glatte Stufe (23) der röhrenförmigen Komponente (1) eingesetzt werden.

6. Sicherheitsverschluss nach einem der Ansprüche 1 bis 5, wobei die Überkappe eine zerbrechliche Überkappe (4, 16) ist, wobei die Überkappe (4, 16) auf-

einanderfolgende Segmente von inneren peripheren Rippen (7) umfasst, welche unter der äußeren peripheren Rippe (8) des unteren Abschnitts der oberen Kappe (2) eingreifen, und eine untere Umrandung (24), welche durch eine Risslinie (24'), die mit peripheren Rippen (25) versehen ist, welche in der peripheren Kerbe (26) der röhrenförmigen Komponente (1) eingreifen, angefügt ist, wobei die untere Kante (5) der unteren Umrandung (24) der peripheren geraden Stufe (6) der röhrenförmigen Komponente (1) zugewandt ist.

7. Sicherheitsverschluss nach Anspruch 6, **dadurch gekennzeichnet, dass** die Überkappe (4) Öffnungen (13, 14) aufweist, die eine direkte Beobachtung des äußeren Abschnitts (15) der oberen Kappe (2) ermöglichen.

8. Sicherheitsverschluss nach Anspruch 6, **dadurch gekennzeichnet, dass** die Überkappe (16) äußerlich glatt ist und geschwächte Linien (17, 17', 17'') hat, welche eine Entfernung der Überkappe (16) ermöglichen.

9. Sicherheitsverschluss nach einem der Ansprüche 1 bis 5, wobei die Überkappe eine unzerbrechliche Überkappe (37) mit einem entfernbaren Versiegelungsband (28) ist, wobei die Überkappe (37) Rippen (37'') umfasst, die zu der äußeren peripheren Rippe (8) des unteren Abschnitts der oberen Kappe (2) passen, wobei das entfernbare Versiegelungsband (28) durch eine Risslinie (27) an die Überkappe (37) angefügt ist und zahlreiche längliche innere Rippen (29, 29', 29'') aufweist, welche die Verdrehung der Überkappe (37) mit den äußeren länglichen Rippen (30, 30', 30'') der röhrenförmigen Komponente (1) aufhalten, wobei die untere Kante (5) des entfernbaren Versiegelungsbands (28) der peripheren geraden Stufe (6) der röhrenförmigen Komponente (1) zugewandt ist.

10. Sicherheitsverschluss nach einem der Ansprüche 1 bis 5, wobei die Überkappe eine eingreifende Metallüberkappe (33) ist, wobei die Überkappe (33) eine Rippe (35) hat, die durch Bördeln erzeugt wird, welche auf der äußeren peripheren Rippe (8) des unteren Abschnitts der oberen Kappe (2) gehalten wird, und eine Reihe von äußeren Reliefs (36, 36', 36''), welche in die länglichen Rippen (37') der äußeren Oberfläche der oberen Kappe (2) eingreifen, wobei die untere Kante (34) der Überkappe (33) zu der peripheren geraden Stufe (6) der röhrenförmigen Komponente (1) passt.

Revendications

1. Bouchon de sécurité pour bouteilles, comprenant

- une partie en forme de cercle (9) adaptée pour être ajustée au rebord supérieur d'un goulot de bouteille et à une région de la partie intérieure de l'orifice de celui-ci, un joint d'étanchéité ou une valve déplaçable (11) s'accouplant à ladite partie en forme de cercle (9), un corps de bouchon (18) reçu par ladite partie en forme de cercle (9), un ensemble capuchon-tube formé par un capuchon supérieur (2) ajusté par vissage sur ledit corps de bouchon (18) et par un composant tubulaire (1) relié audit capuchon supérieur (2) par une ligne d'affaiblissement (3) et ajusté à l'extérieur du goulot de bouteille, ledit bouchon de sécurité comprenant également un sur-capuchon (4, 16, 37, 33) recouvrant extérieurement ledit capuchon supérieur (2), ledit capuchon supérieur (2) étant pourvu d'une nervure périphérique (8) sur sa surface extérieure, laquelle est située sur la partie inférieure dudit capuchon supérieur (2), et une pluralité de nervures longitudinales (37') s'étendant au-dessus de ladite nervure périphérique (8), **caractérisé par** la configuration suivante dudit ensemble capuchon-tube, lui permettant de recevoir éventuellement l'un parmi un sur-capuchon cassable (4, 16), un sur-capuchon non-cassable (37) avec une bande de scellage amovible (28) ou un sur-capuchon métallique à engagement (33) : ledit composant tubulaire (1) étant pourvu, sur sa partie supérieure, d'un gradin intérieur lisse (23), d'une rainure périphérique extérieure (26), d'une pluralité de nervures longitudinales extérieures (30, 30', 30'') s'étendant au-dessus de ladite rainure périphérique (26), et d'un gradin droit périphérique (6) situé en dessous de ladite rainure périphérique extérieure (26) ; en outre **caractérisé en ce qu'**une multitude de saillies (22, 22', 22'') prévues sur un gradin (19) formé par une bride inférieure (20) dudit corps de bouchon (18) est ajustée de façon serrée dans ledit gradin intérieur lisse (23) du composant tubulaire (1) assurant ainsi un maintien sans torsion.
2. Bouchon de sécurité selon la revendication 1, **caractérisé en ce que** ladite multitude de saillies (22, 22', 22'') est arrangée sur la ligne de délimitation intérieure (21) dudit gradin (19) formé par la bride inférieure (20) du corps de bouchon (18).
 3. Bouchon de sécurité selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** ladite multitude de saillies (22, 22', 22'') est arrangée de manière à occuper de petits secteurs angulaires de la bride inférieure (20) du corps de bouchon (18).
 4. Bouchon de sécurité selon la revendication 3, **caractérisé en ce que** lesdits petits secteurs angulaires sont disposés selon une disposition diamétralement opposée autour de la bride inférieure du corps de bouchon.
 5. Bouchon de sécurité selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** ladite multitude de saillies (22, 22', 22'') présente des régions pointues et/ou des bords tranchants, de sorte que la multitude de saillies (22, 22', 22'') est insérée par compression dans ledit gradin lisse (23) du composant tubulaire (1).
 6. Bouchon de sécurité selon l'une quelconque des revendications 1 à 5, dans lequel ledit sur-capuchon est un sur-capuchon cassable (4, 16), dans lequel ledit sur-capuchon cassable (4, 16) comprend des segments successifs de nervures périphériques intérieures (7) s'engageant en dessous de ladite nervure périphérique extérieure (8) de la partie inférieure du capuchon supérieur (2), et une bordure inférieure (24) reliée par une ligne de déchirure (24'), pourvue de nervures périphériques (25) s'engageant dans ladite rainure périphérique (26) du composant tubulaire (1), le rebord inférieur (5) de ladite bordure inférieure (24) étant tourné vers ledit gradin droit périphérique (6) dudit composant tubulaire (1).
 7. Bouchon de sécurité selon la revendication 6, **caractérisé en ce que** ledit sur-capuchon (4) comporte des orifices (13, 14) permettant une observation directe de la partie extérieure (15) dudit capuchon supérieur (2).
 8. Bouchon de sécurité selon la revendication 6, **caractérisé en ce que** ledit sur-capuchon (16) est lisse extérieurement et comporte des lignes d'affaiblissement (17, 17', 17'') permettant le retrait dudit sur-capuchon (16).
 9. Bouchon de sécurité selon l'une quelconque des revendications 1 à 5, dans lequel ledit sur-capuchon est un sur-capuchon non-cassable (37) avec une bande de scellage amovible (28), dans lequel ledit sur-capuchon (37) comprend des nervures (37'') s'accouplant avec ladite nervure périphérique extérieure (8) de la partie inférieure du capuchon supérieur (2), ladite bande de scellage amovible (28) étant reliée audit sur-capuchon (37) par une ligne de déchirure (27) et comportant une multitude de nervures intérieures longitudinales (29, 29', 29'') destinées à bloquer la torsion dudit sur-capuchon (37) avec lesdites nervures longitudinales extérieures (30, 30', 30'') du composant tubulaire (1), le rebord inférieur (5) de ladite bande de scellage amovible (28) étant tourné vers ledit gradin droit périphérique (6) du composant tubulaire (1).
 10. Bouchon de sécurité selon l'une quelconque des revendications 1 à 5, dans lequel ledit sur-capuchon est un sur-capuchon métallique à engagement (33), dans lequel ledit sur-capuchon (33) comporte une nervure (35) réalisée par sertissage, laquelle est

maintenue sur ladite nervure périphérique extérieure (8) de la partie inférieure du capuchon supérieur (2), et une rangée de reliefs (36, 36', 36'') s'engageant dans lesdites nervures longitudinales (37') de la surface extérieure du capuchon supérieur (2), le rebord inférieur (34) dudit sur-capuchon (33) étant ajusté audit gradin droit périphérique (6) du composant tubulaire (1).

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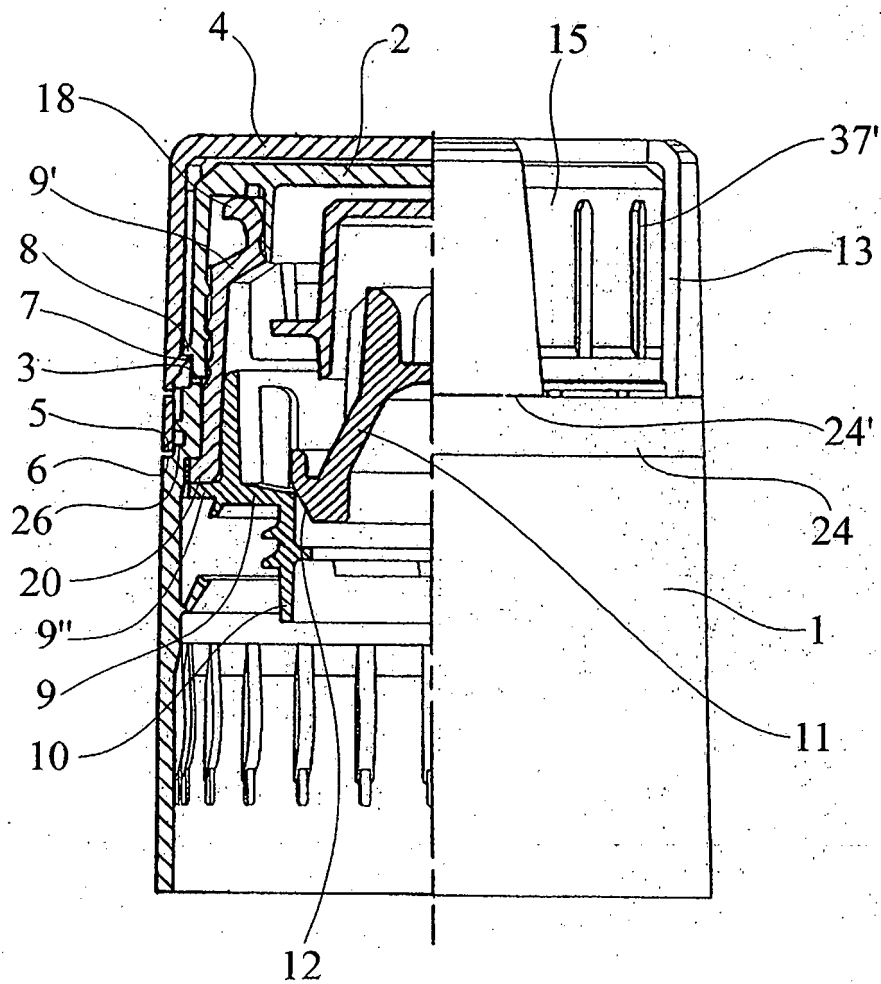


FIG. 1

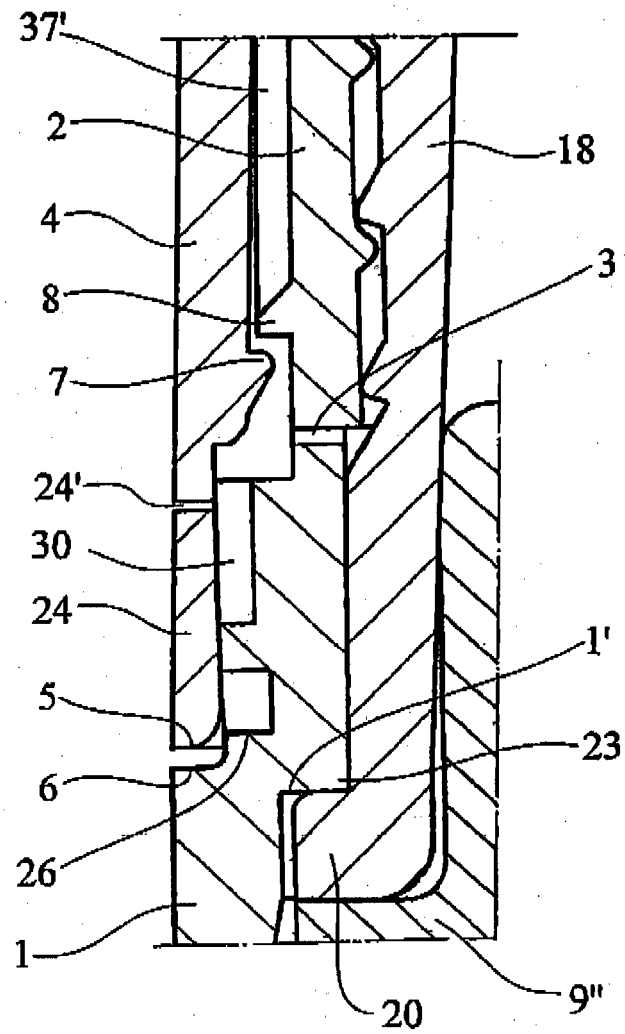


FIG. 1A

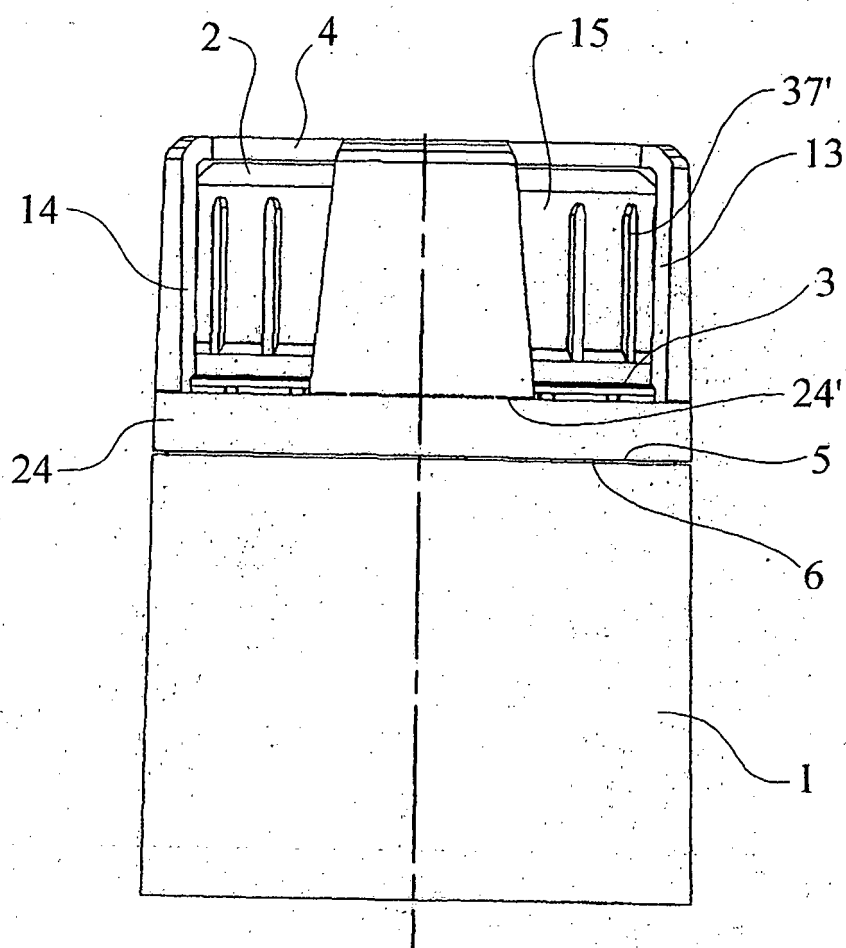


FIG. 2

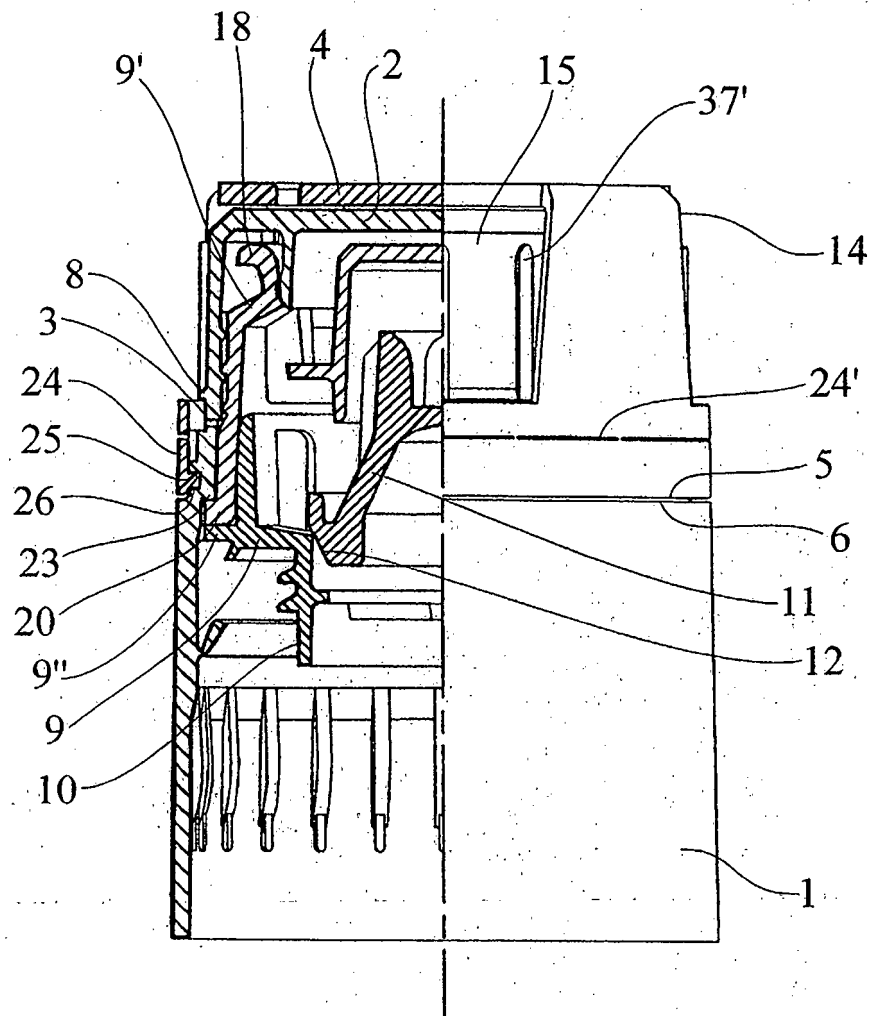


FIG. 3

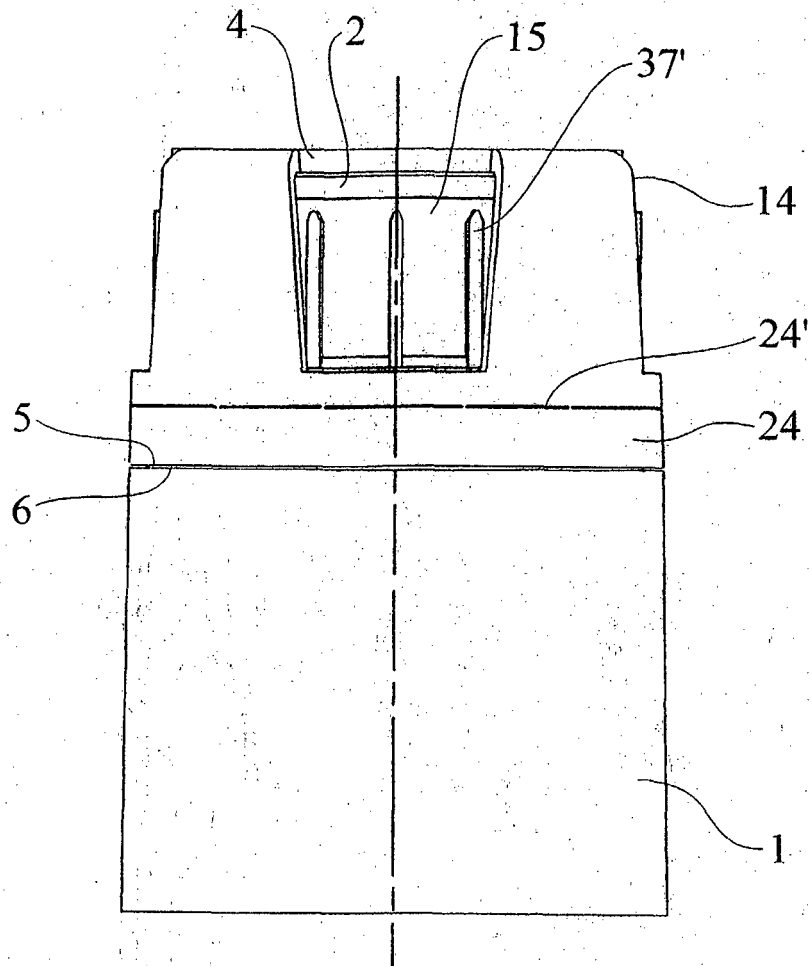


FIG. 4

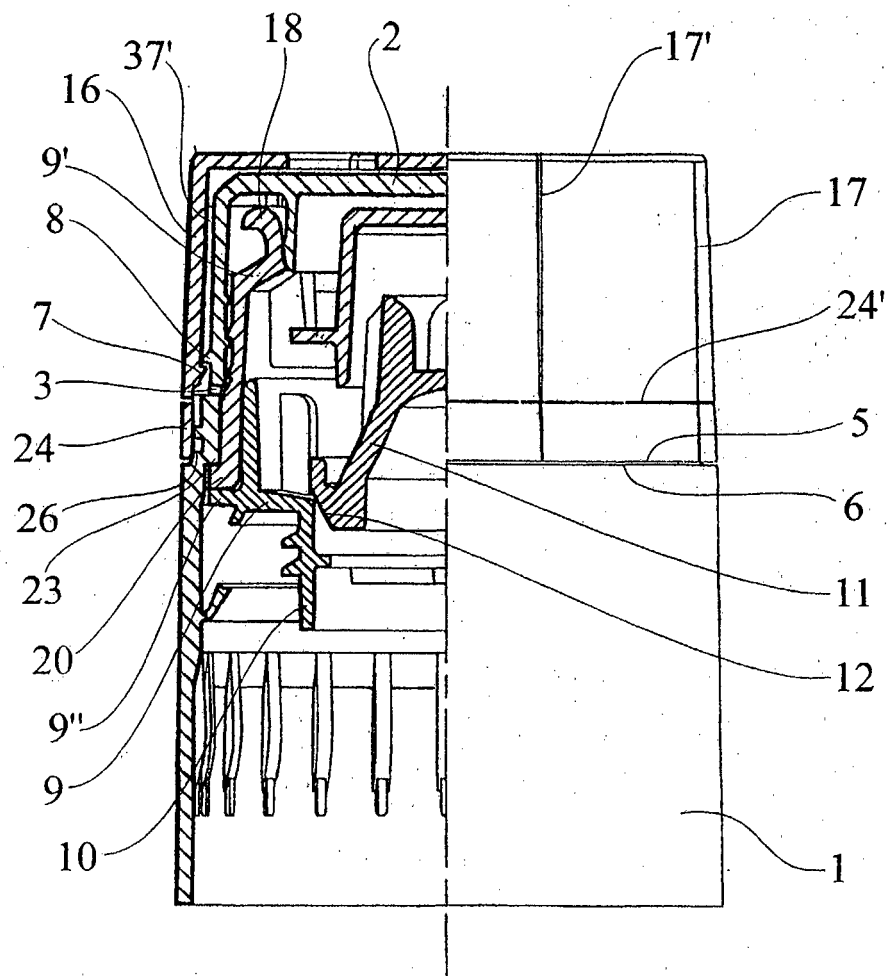


FIG. 5

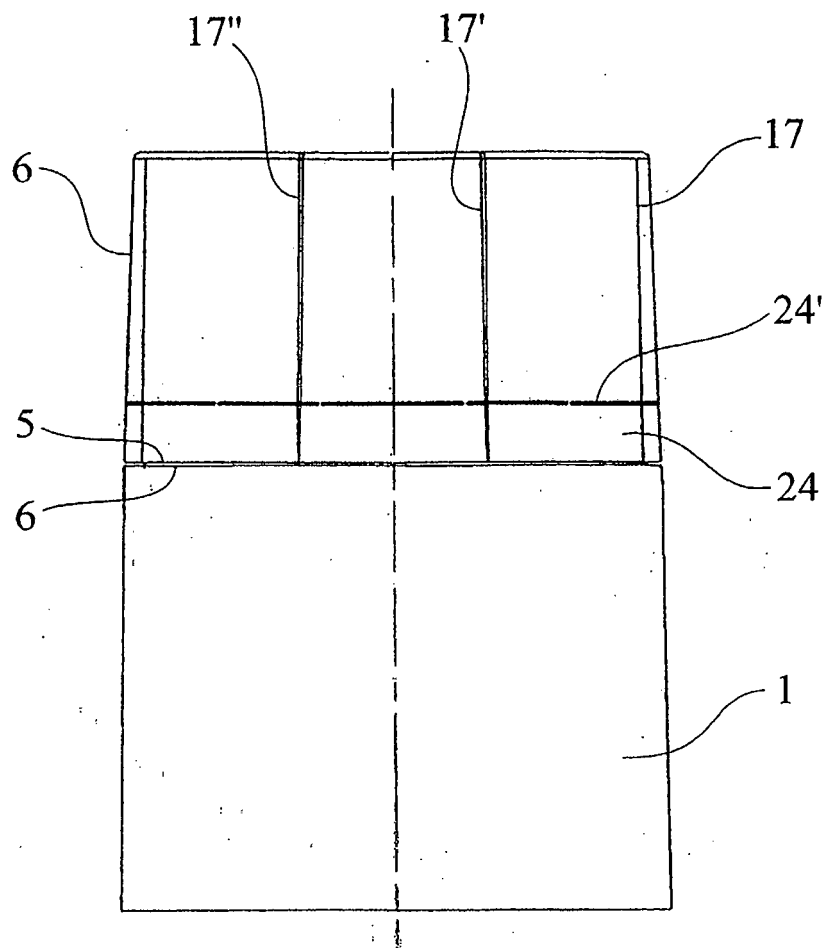


FIG. 6

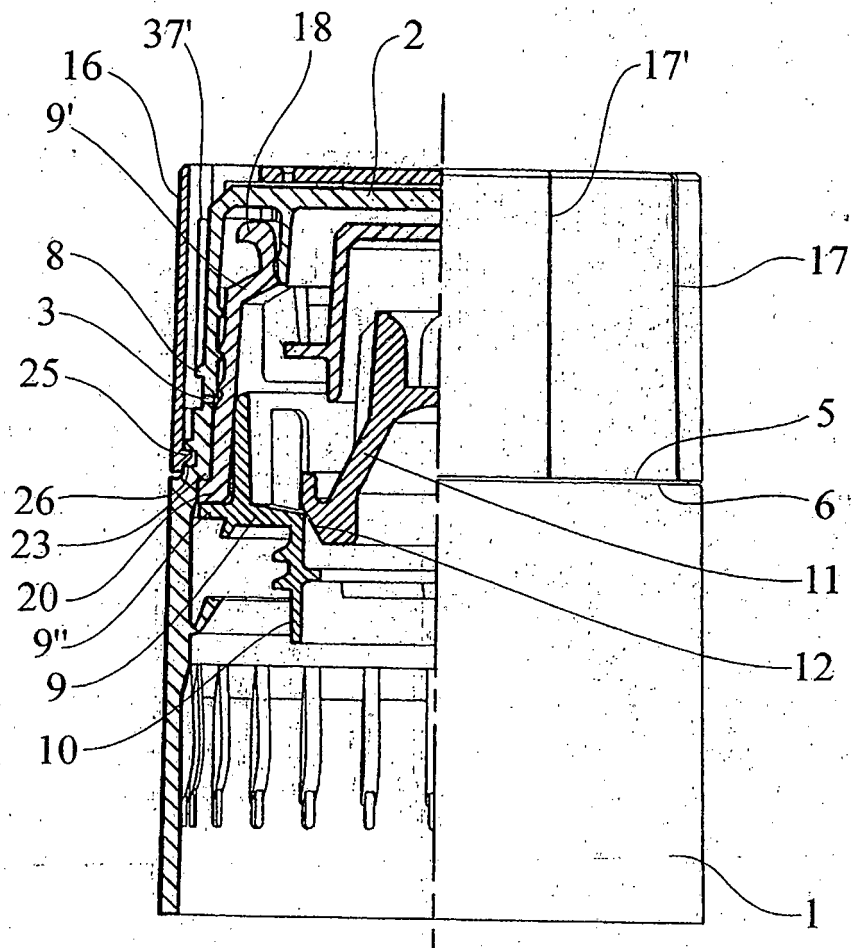


FIG. 7

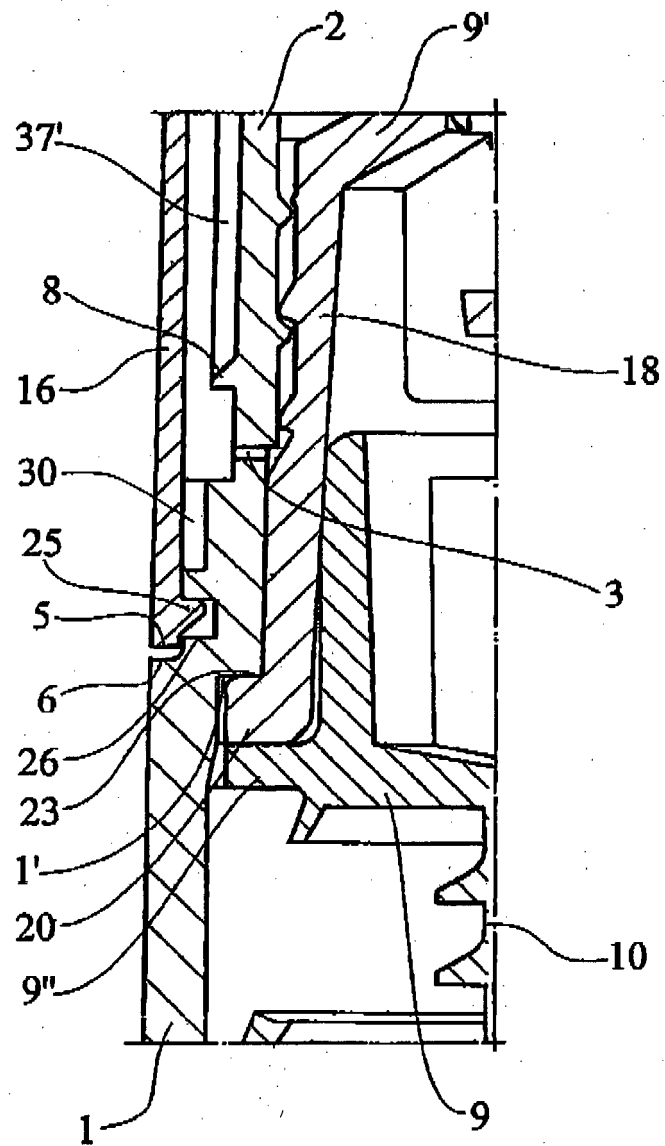


FIG. 7A

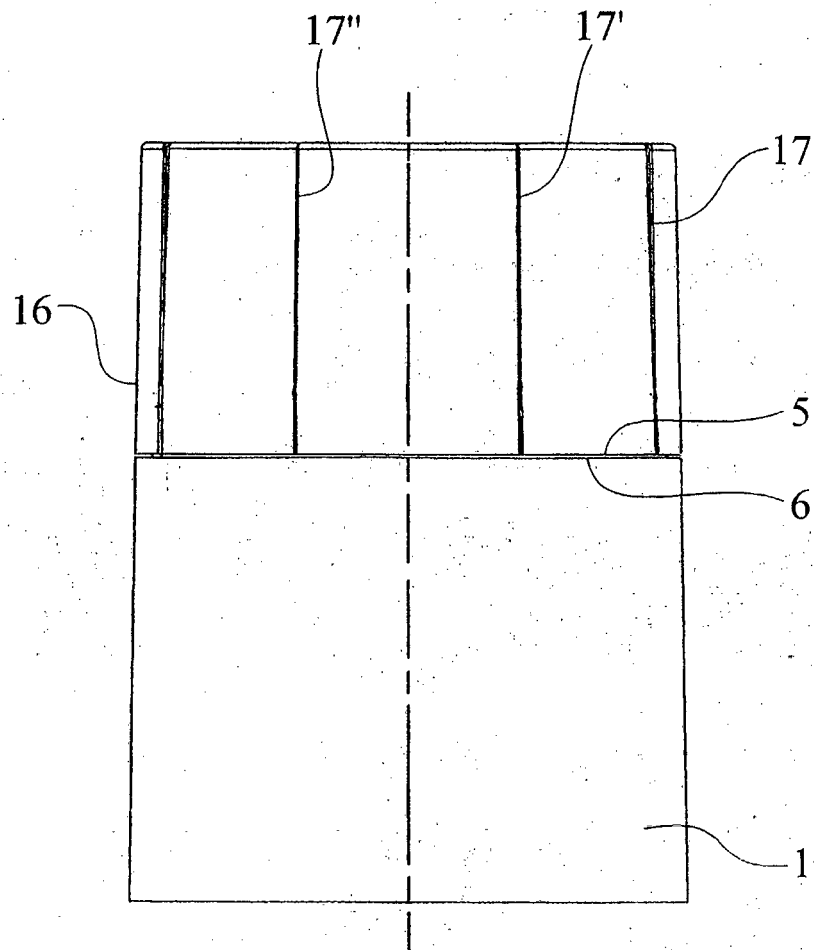


FIG. 8

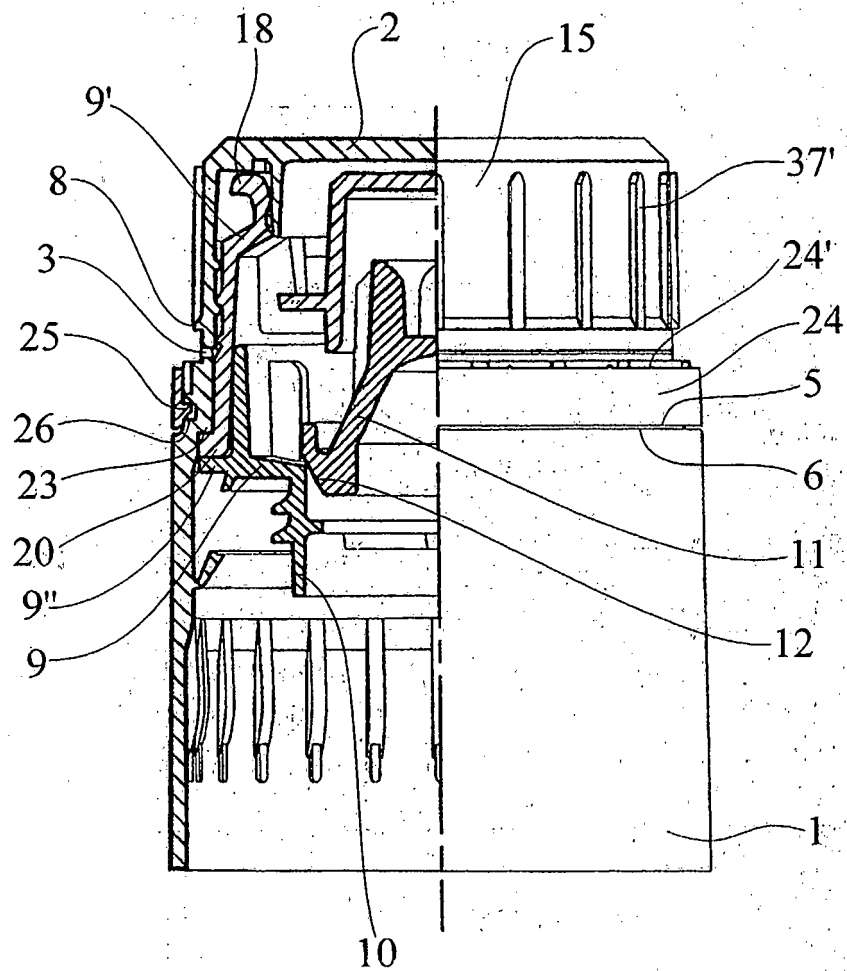


FIG. 9

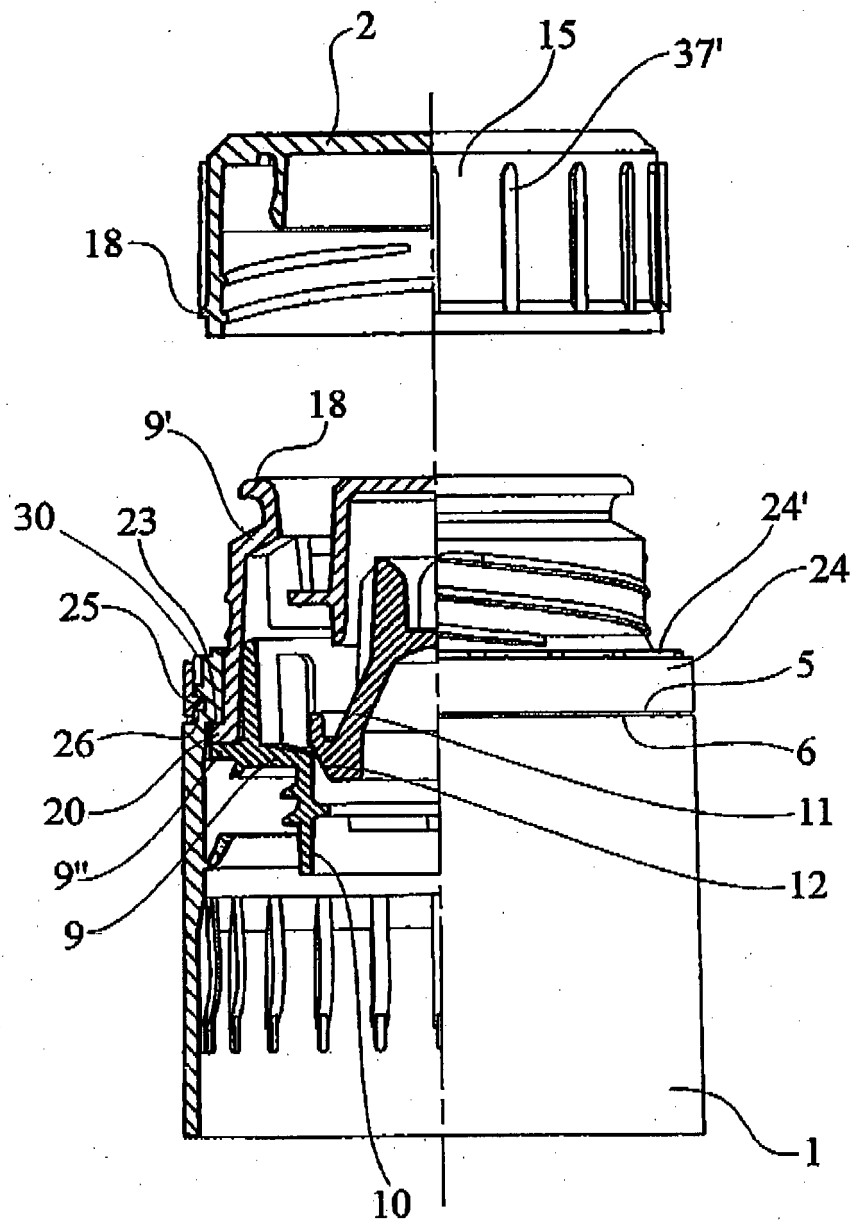


FIG. 10

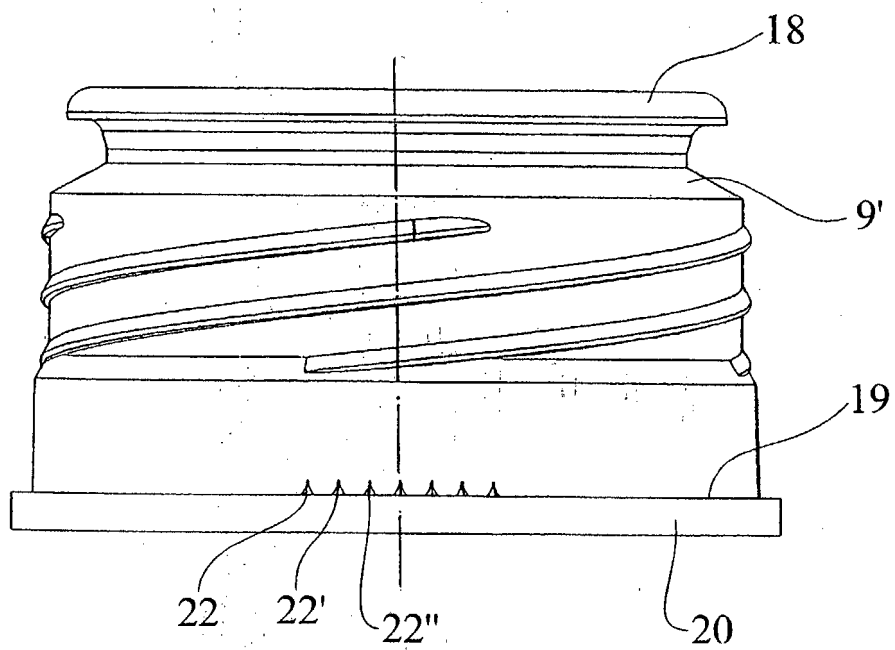


FIG. 11

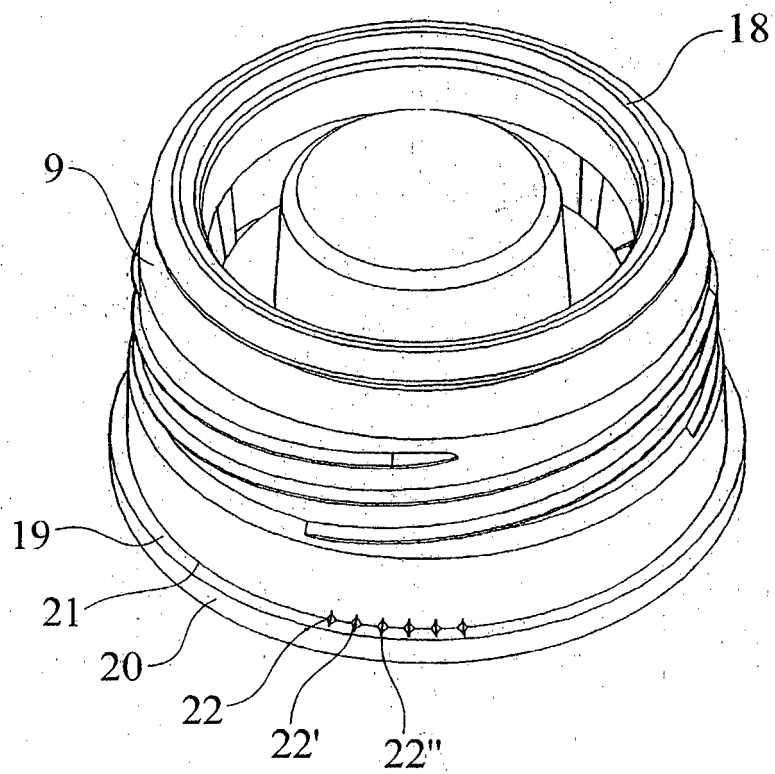


FIG. 12

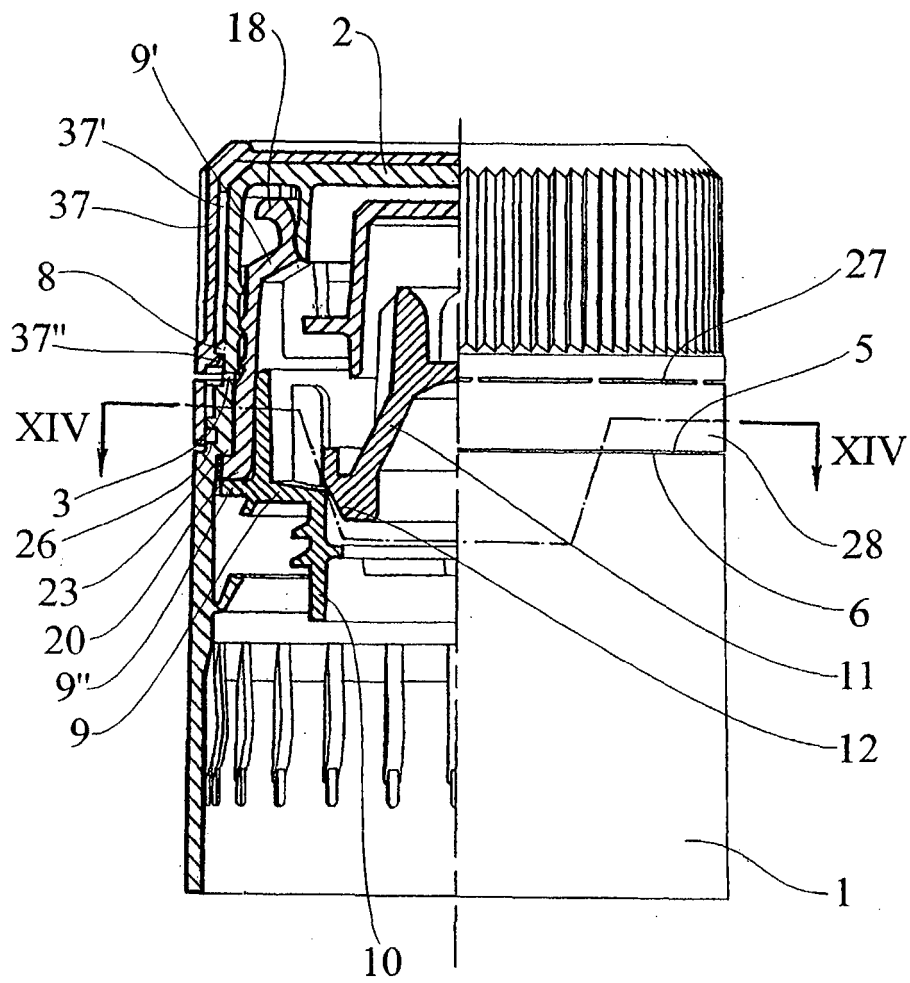


FIG. 13

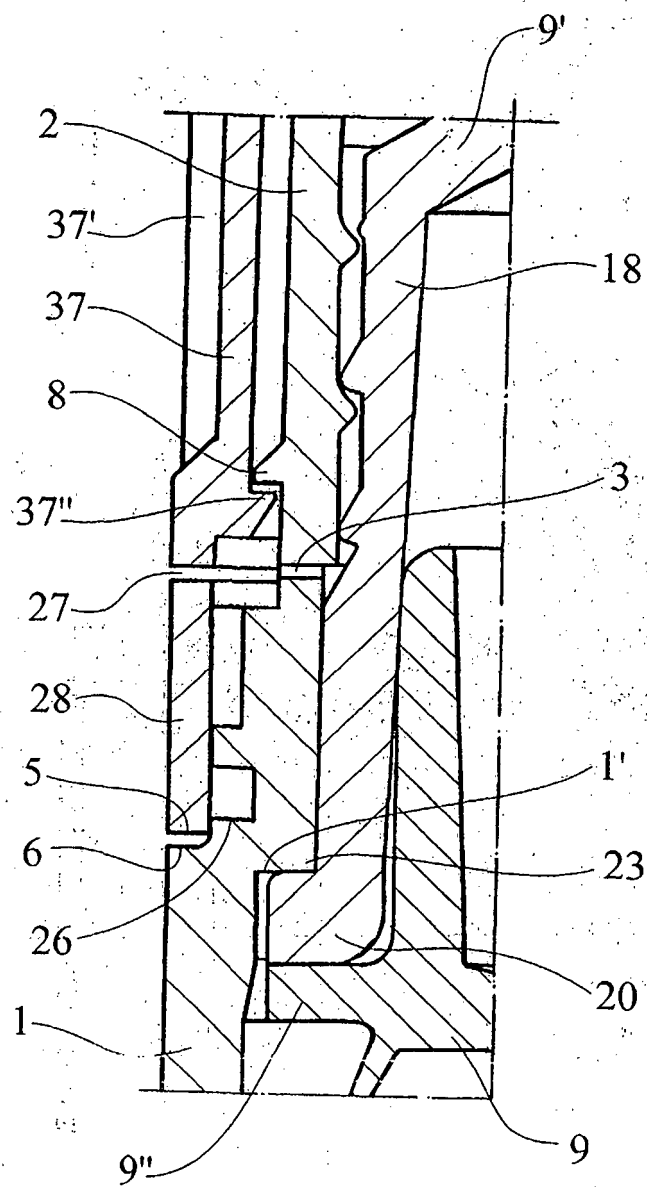


FIG. 13A

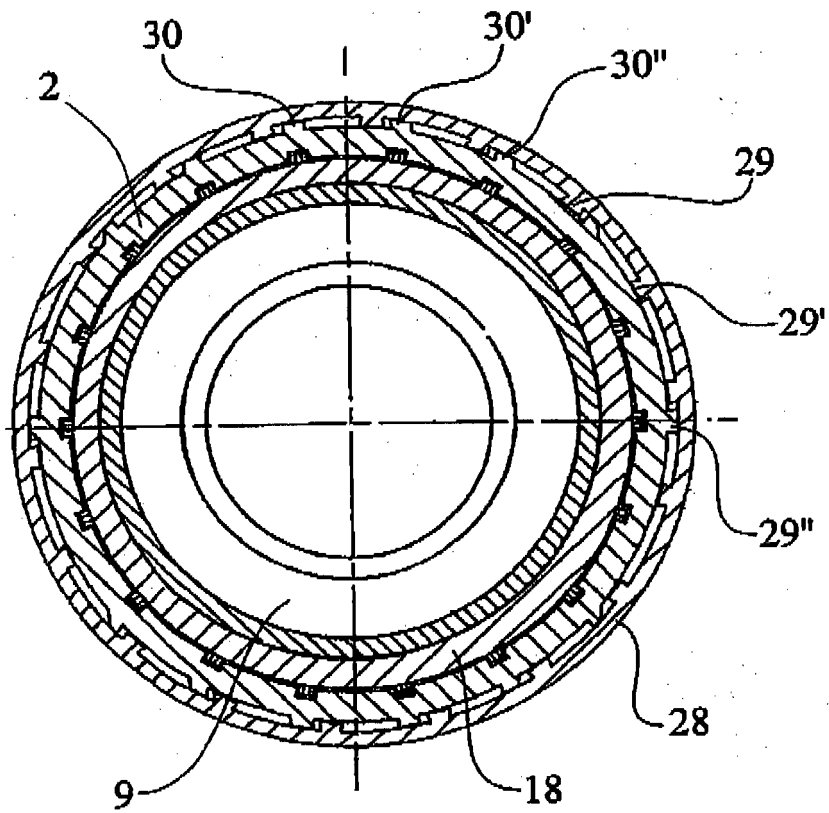


FIG. 14

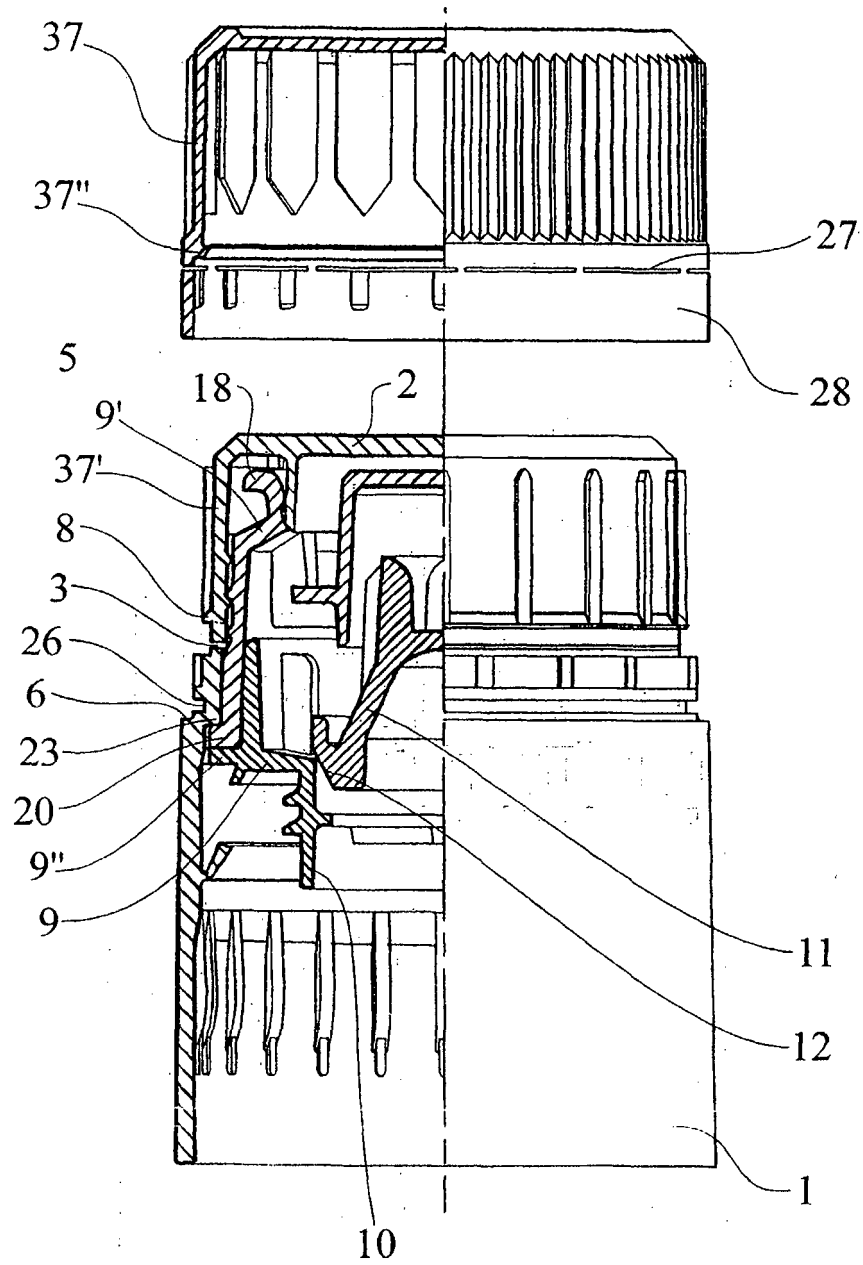


FIG. 15

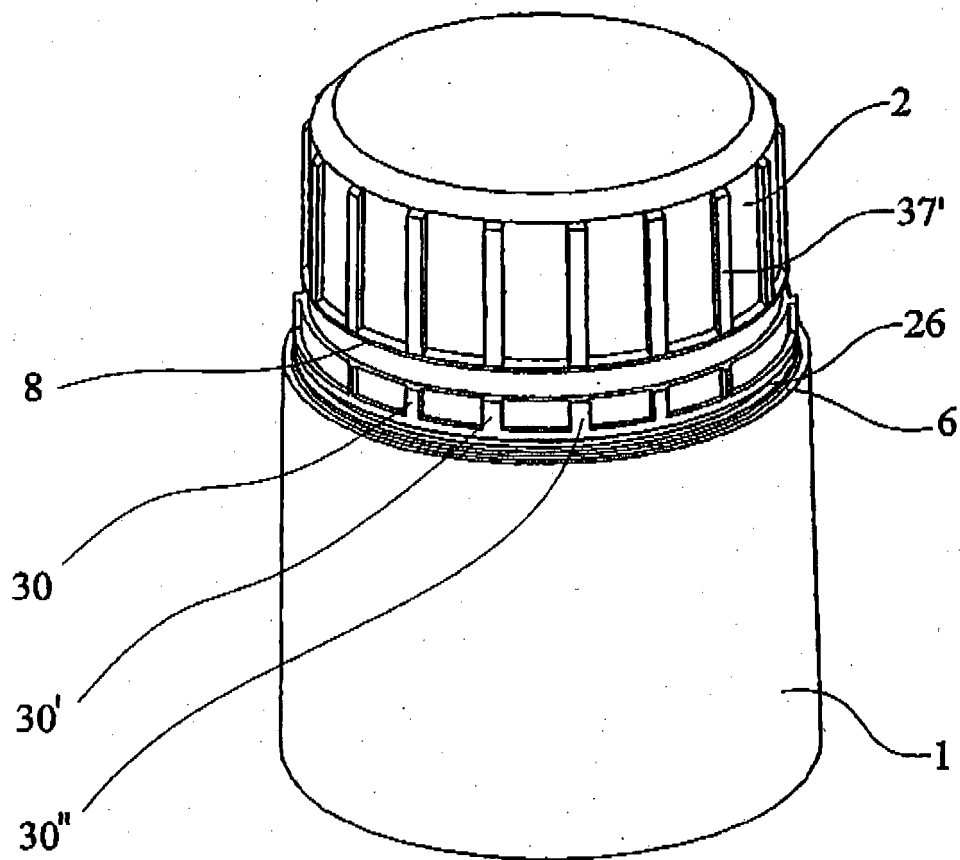


FIG. 16

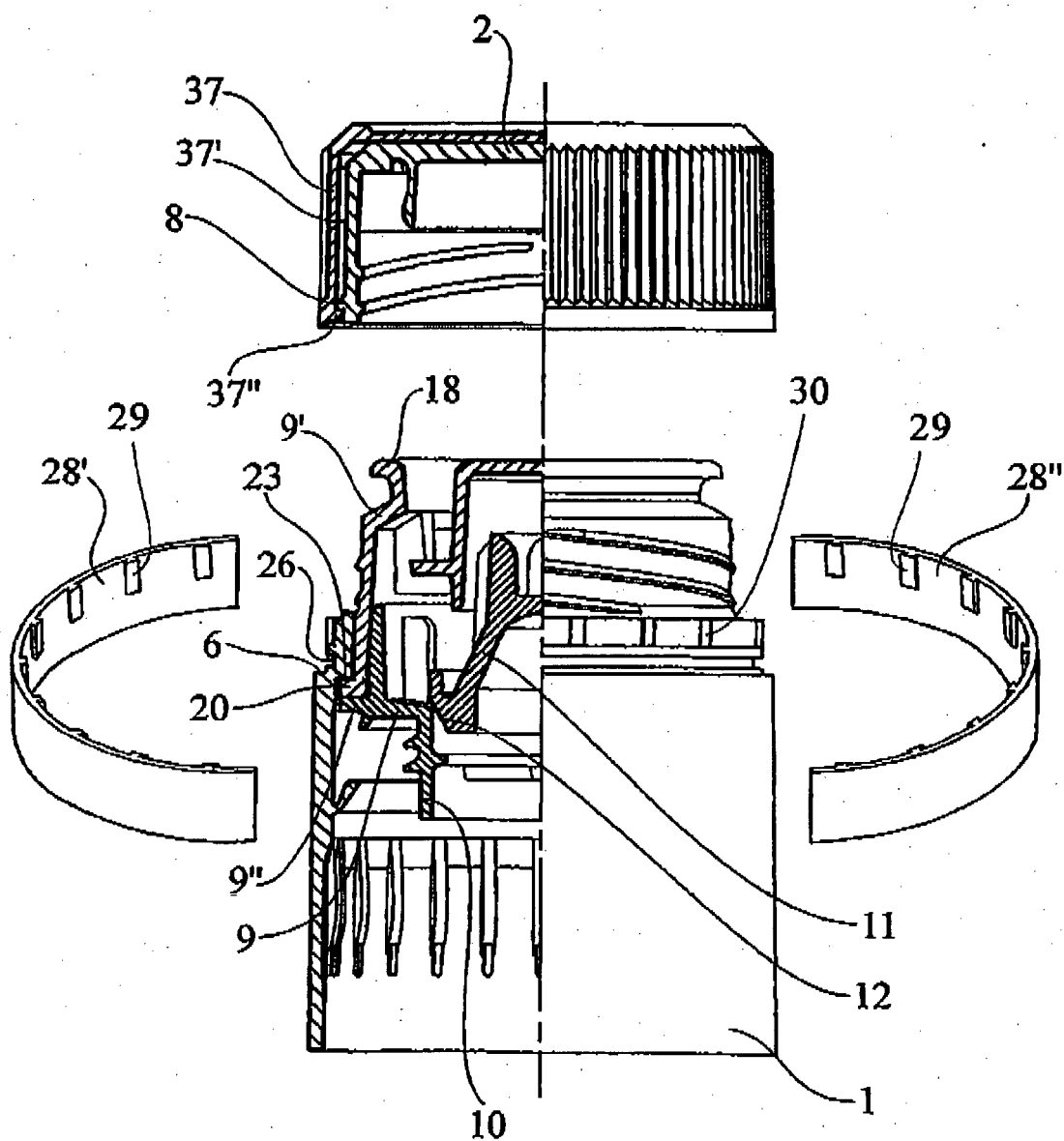


FIG. 17

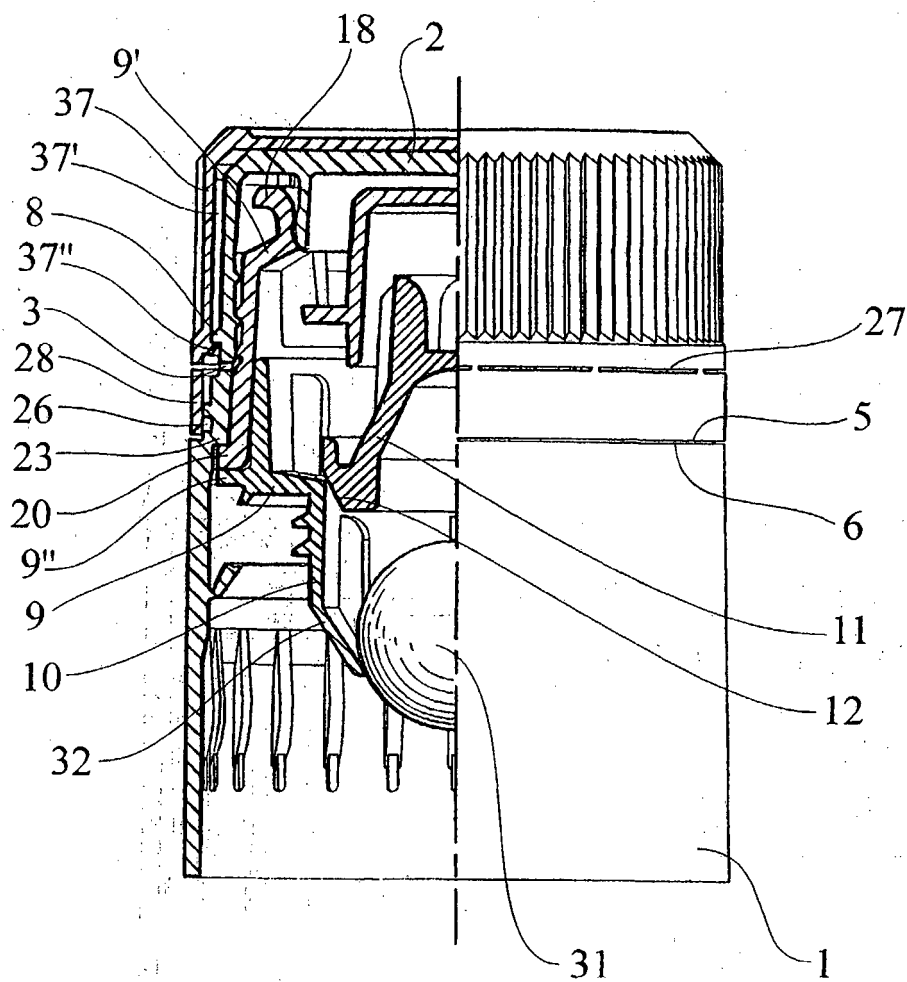


FIG. 18

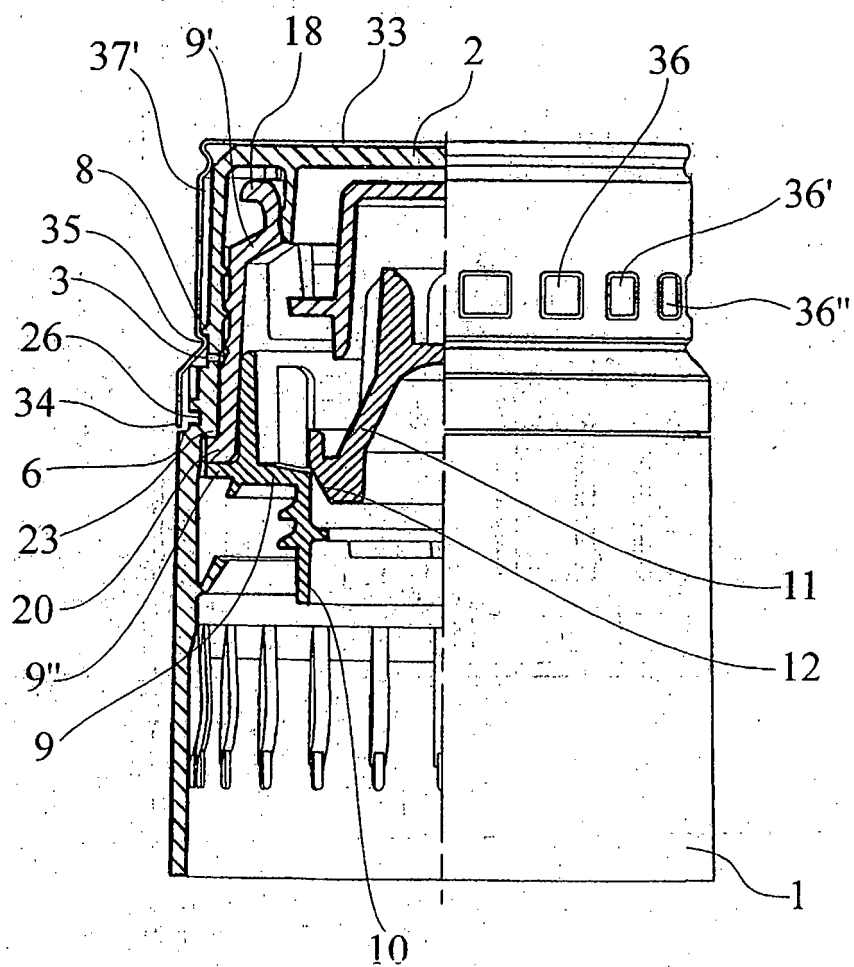


FIG. 19

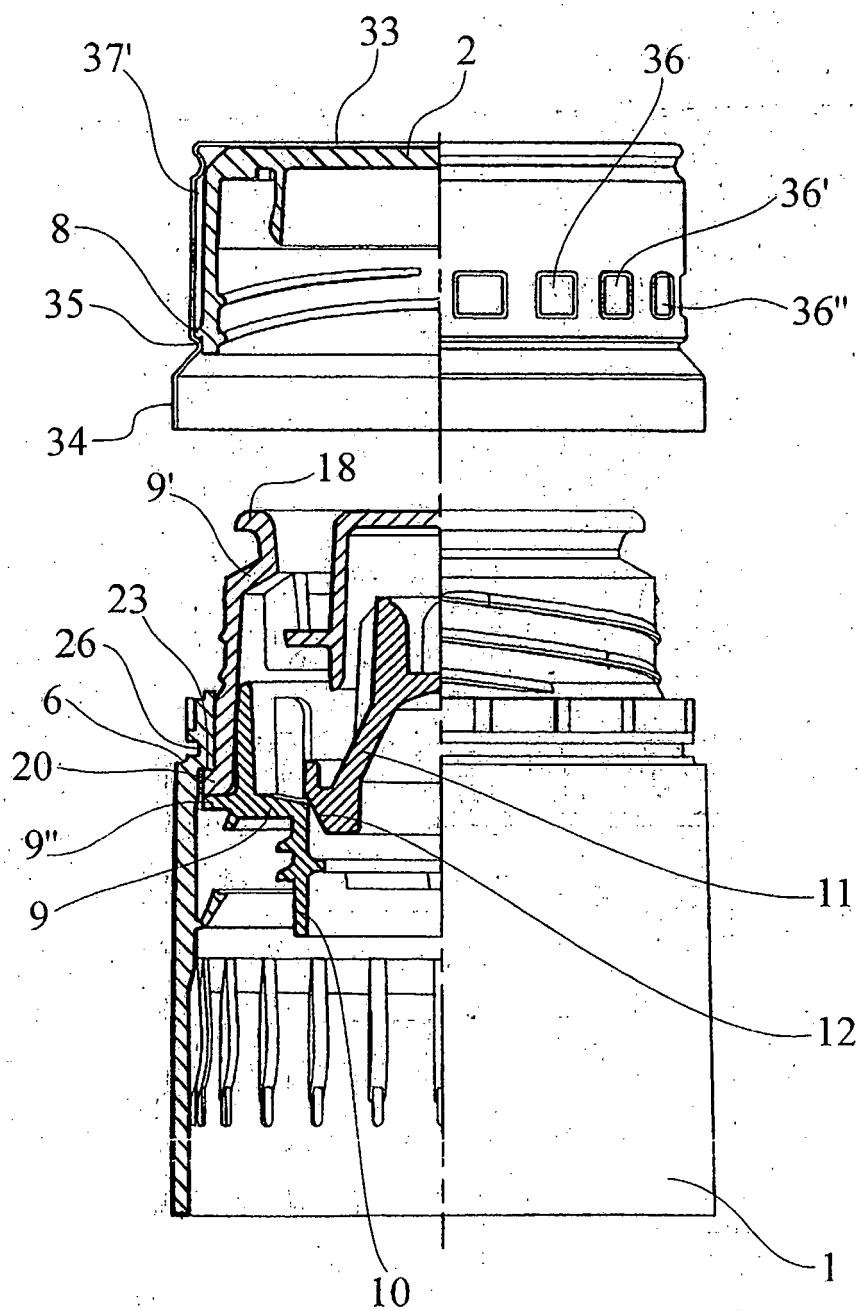
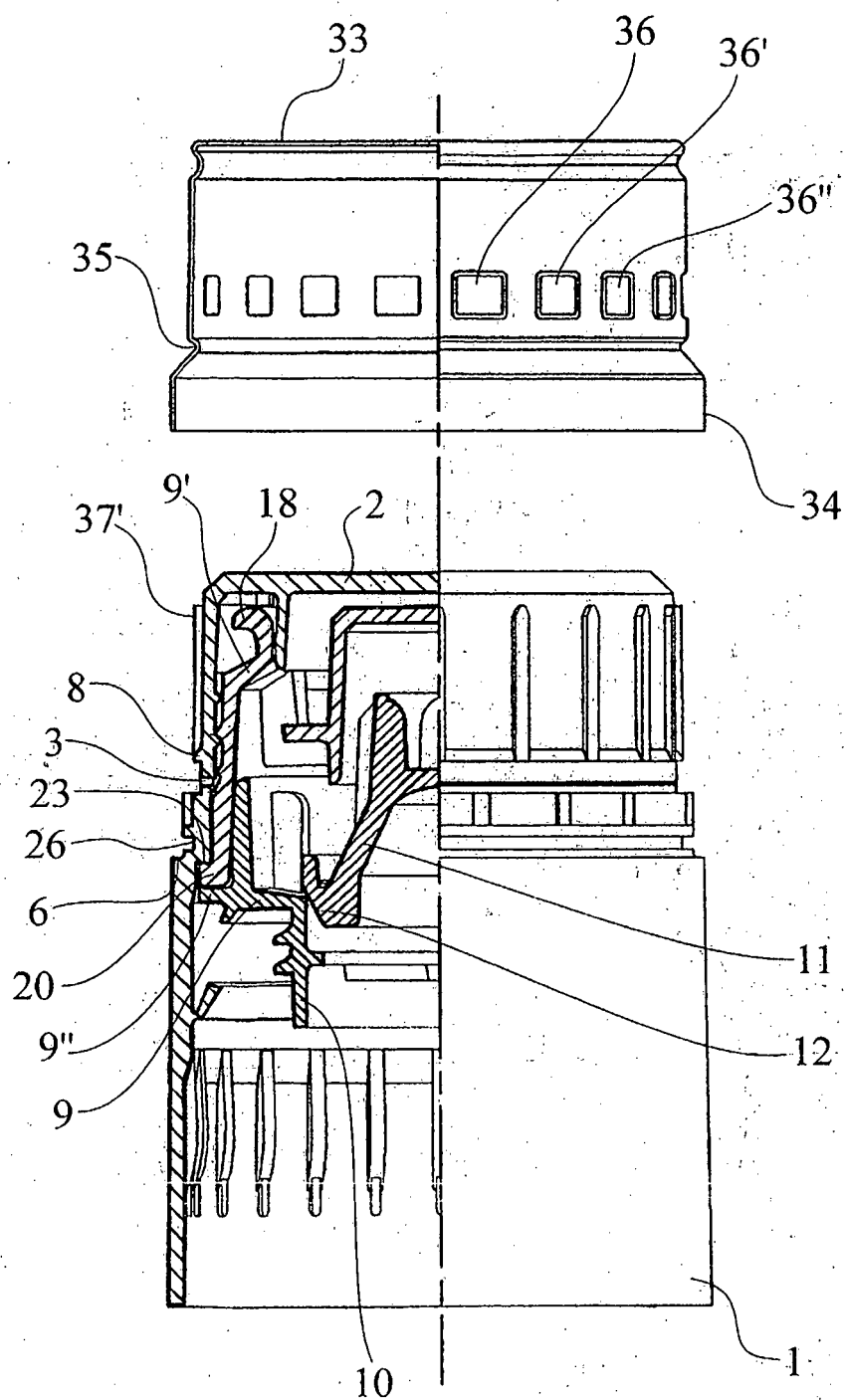


FIG. 20



REFERENCES CITED IN THE DESCRIPTION

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