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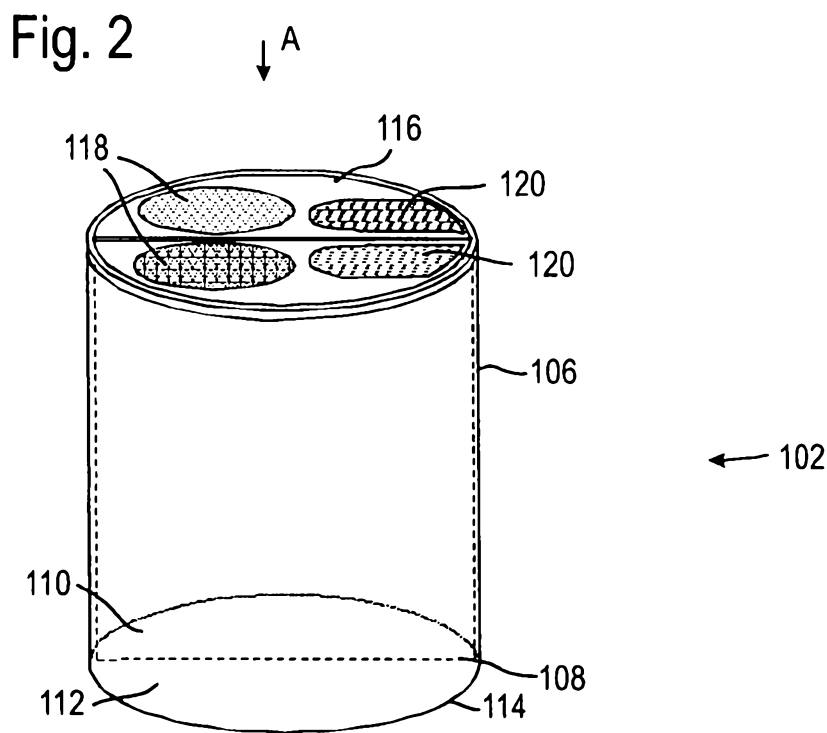
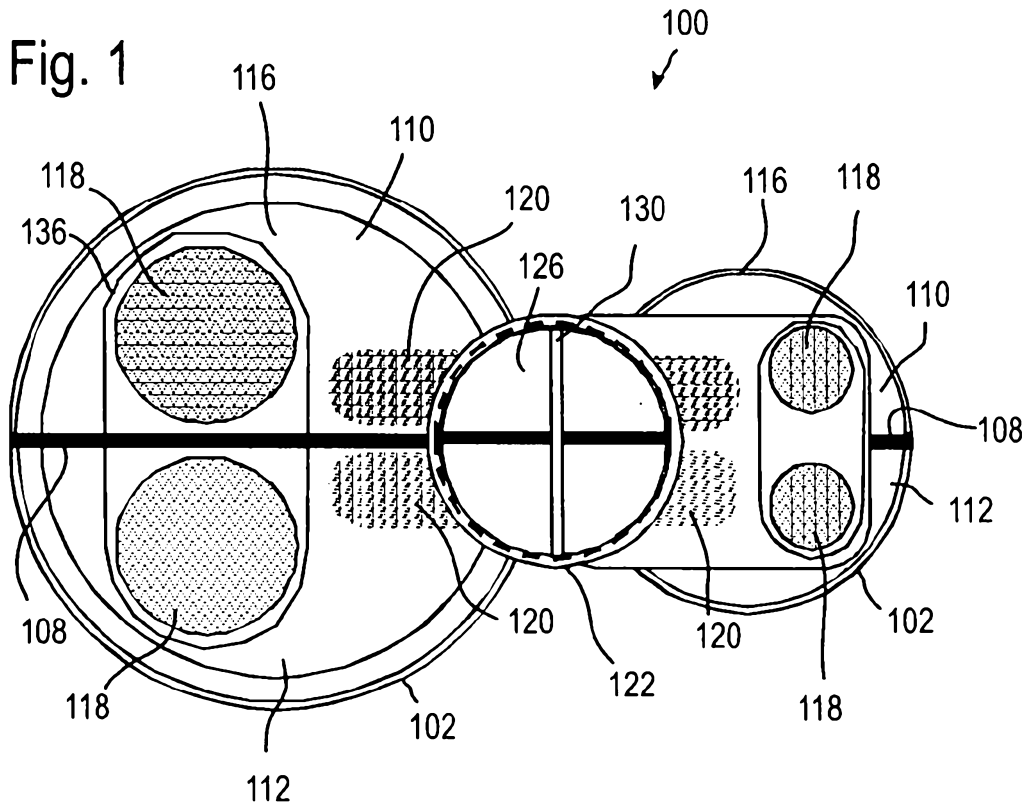
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ABSTRACT

Foil Cartridge and Method for Producing a Foil Cartridge

A foil cartridge has a foil tube (106) enclosing at least one chamber (110, 112) in the circumferential direction and a cover (116) separate from the foil tube (106), said cover closing an axial end of the foil tube (106). At least one first opening (118) is configured in the cover (116) for each chamber (110, 112), through which opening the chamber (110, 112) may be filled with a filling material. A closure (136) is provided, which seals the first opening (118). To produce the foil cartridge, the chamber (110, 112) is established by connecting the cover (116) with the foil tube (106). Then the chamber (110, 112) is filled with a filling material through the first opening (118) in the cover (116) and the first opening (118) is sealed.

Fig. 1



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ORIGINAL

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Invention Title: Foil cartridge and method for producing a foil cartridge

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

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Foil Cartridge and Method for Producing a Foil Cartridge

DESCRIPTION

[0001] The invention relates to a foil cartridge as well as a method for producing a foil cartridge.

[0002] Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

[0003] Foil cartridges having one or more chambers containing chemical compounds such as putty compounds, sealants or adhesive compounds are known. This type of foil cartridge is used in a cartridge holder of a dispensing device which is used to apply the chemical compounds to the desired location.

[0004] The use of foil cartridges in which the chamber is essentially formed by a foil tube is beneficial because empty cartridges may be disposed of without great expense and without requiring a lot of space. For example, it is known from DE 295 01 255 U1 that the chamber may be created by combining the two ends of the foil bag into a "ponytail," which is then sealed by a metal clip. However, the disadvantage of this is, for one, that the axial ends of the chamber are not hermetically sealed so that there is always a certain amount of leakage especially of the mobile liquid content to some extent from the capillary forces in the "ponytail." Secondly, there is the problem of reproducibly opening the foil pouch. To this end, a piercing device is used in DE 295 01 255 U1, which has two piercing spars that are supposed to create a defined opening in the foil pouch. Nevertheless, the actual shape of the opening depends upon how the foil material tears in individual cases.

[0005] It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

[0006] The object of a preferred embodiment of the invention is creating a foil cartridge that is simple and cost-effective to produce, which can be opened reliably and reproducibly.

[0007] According to a first aspect of the invention there is provided a foil cartridge having a foil tube enclosing at least one chamber in the circumferential direction and a cover separate from the foil tube, said cover closing an axial end of the foil tube, wherein at least

one first opening is configured in the cover for each chamber, through which opening the chamber may be filled with a filling material, and a closure, which seals the first opening.

[0008] The advantages of the foil tube are retained, specifically quick and cost-effective production as well as space-saving storage after it is empty. However, the use of the separate cover permits defined and if applicable dimensionally stable openings to be provided, which may be uncovered by removing or destroying the closure in a targeted manner in a defined diameter. Opening is preferably accomplished when the foil cartridge is inserted into the dispensing device. In addition, because of this design, it is possible to first manufacture the foil cartridge and then fill it, because the first opening is also simple to seal even after a separate filling process. In the case of previous foil cartridges, manufacturing and filling were carried out in one production step, because the foil pouch was firmly sealed on both ends and thus did not have an opening through which a filling process could take place.

[0009] The second axial end of the foil tube may be sealed by a base that is separate from the foil tube but connected thereto. In this way, it is possible to configure a cylindrical chamber with a defined volume in a simple manner. The base may be made for example of the same material as the cover or that of the foil tube and may correspond in terms of size and dimensions to at least approximately that of the cover.

[0010] The cover is preferably formed of a more rigid material than the foil tube, e.g., polyethylene, polypropylene, polybutylene terephthalate or acrylnitrile butadiene styrene.

[0011] The foil cartridge may be configured as a multi-chamber cartridge, wherein the different chambers are able to accommodate different filling materials, which are not mixed with one another until the material is dispensed.

[0012] If several chambers are provided, they may be filled with different filling materials. The filling materials may form for example components of sealants, mortars, coating compounds, paints, foam intermediate products, adhesives or lubricants. But it is also possible for at least two chambers to be filled with the same filling material in order realize high mixing ratios. Several chambers may be formed, for example, in that the foil tube is subdivided in the axial direction into several chambers, which extend parallel to one another in the axial direction. For this purpose, one or more foil sections extending in the axial direction parallel to the foil tube are introduced into said foil tube and are glued or welded to

the walls of the foil tube as well as among each other. The individual chambers are completely separate from one another as long as the foil cartridge is sealed.

[0013] Several chambers may also be formed in that an additional foil tube is provided, which is arranged in the first foil tube so that the first foil tube extends parallel to the second foil tube. This design makes it possible to achieve in particular a larger volume difference between the chambers. A second foil tube lying inside the first foil tube is able to accommodate a component that is required in a much lower volume fraction in the finished mixture than the component in the large outerlying chamber. The chambers may be arranged coaxially, but the inner foil tube may also be offset from the axis. The use of foil tubes and partitions may also be combined so that, depending upon the intended use, it is possible to achieve any design of the chambers.

[0014] All chambers preferably extend up to the cover, where each chamber is assigned its own first opening. All the chambers also preferably extend to the base.

[0015] A head section is preferably provided, which is firmly connected to the cover and which has an outlet opening provided on a receptacle for a mixing tube for dispensing the filling material. The head section is preferably fabricated of a relatively rigid material so that the outlet opening does not get deformed when the filling material is dispensed.

[0016] The outlet opening may be sealed (prior to use of the foil cartridge) by a closure.

[0017] At least one channel for guiding the filling material to the outlet opening is formed between the cover and an inner wall of the head section. In the case of several chambers, a channel is preferably formed for each chamber, which advantageously runs separately up to the outlet opening in order to prevent mixing of the filling materials in the individual chambers within the foil cartridge. Because of the channels, the individual components and filling materials are also completely separated from one another even when the foil cartridge has been opened before exiting from the outlet opening.

[0018] The connection between the foil tube and cover or base as well as between the cover and head section may be accomplished by adhesion or welding, in particular ultrasonic, laser or thermal welding.

[0019] The head section and cover may also be connected by locking into place or by caulking. Naturally, a combination of these measures may also be utilized. All connections are preferably executed so that the chambers are tightly hermetically sealed.

[0020] In a preferred embodiment of the invention, a discharge opening separate from the first opening is provided for each chamber. This offers various advantages for the filling process of the foil cartridges. For example, it is possible to fill the chamber via the first opening enough so that the channel up to the outlet opening is completely filled with the filling material. This makes it possible to minimize the first runnings, because the mixing ratio for multi-component cartridges corresponds to the desired mixing ratio at the very beginning.

[0021] It is possible to seal adjacent first openings, discharge openings or filling openings with common closures.

[0022] One or more foils, for instance a composite foil or monofoil, are preferably provided as the closure for both the first openings, the discharge openings and the outlet opening. The foils may be made, e.g., of one or more layers of polyethylene, polypropylene, polybutylene terephthalate or ethylene vinyl copolymer and/or aluminum.

[0023] The foil is preferably welded or adhered to the edge of the opening. A tear-off tab may be provided for ease of removal.

[0024] A metal plate or an injection molded part may also be provided as a closure, in particular for the filling openings in the head section. These closures may also be sealed with the edge of the opening preferably by adhesion or welding.

[0025] The closure may be placed directly on the respective opening.

[0026] Several possibilities are conceivable for opening or removing the closure. For example, a foil may be designed in such a way that it may be pulled off as a whole and the discharge opening or the outlet opening is completely exposed after the foil is removed. However, a foil may also have one or more weakened zones along which the foil tears in a controlled manner due to the excess pressure applied by the dispensing device and which define the outlet opening or uncover the discharge opening. It is possible to produce the weakened zone in a very reproducible manner for example by laser removal.

[0027] The closure, in particular the closure for the first openings, may be provided for example with the material information about the components of the filling material, a lot number or even the expiration date. It may also be used as the case may be to label the foil cartridge.

[0028] In order to improve the filling process, the edge of the first opening and/or the outlet [filling] opening may have a conical taper. The taper is used to center a filling lance and thereby produce a tighter closure between the filling lance and the edge of the opening.

[0029] At least one lip is preferably configured on the edge of the first opening and/or the outlet [filling] opening. The advantageously circumferential lip, or even a corresponding ridge, is used to strip off the filling material from the filling lance when retracting the filling lance so that no filling material is introduced into the filling device. Several lips or ridges may also be arranged axially in succession in order to strip off the greatest possible portion of the filling material.

[0030] Coarse or relatively large fillers may be used in the individual components of the filling materials, because the first opening may be designed to be large enough that it is possible to fill in such components without a problem. The size of the channels may also be simply selected so that coarser fillers may be used in the filling materials.

[0031] It is possible to achieve long storage periods because the chambers are hermetically sealed and separated from one another and the leakage rate is virtually zero due to the design of the chambers.

[0032] Independent of the number of components used, the outer geometry of the foil cartridge may be designed to be the same. This makes it possible to use one dispensing device for different types of filling materials.

[0033] The outlet opening may also remain unsealed. In this case, the discharge opening is preferably sealed by a closure provided with a weakened zone, and when the dispensing pressure is applied when inserting a still sealed new foil cartridge into the dispensing device, the internal pressure exceeds the force required to open the weakened zone. In this way, it is possible to automatically open the newly inserted foil cartridge in a controlled manner.

[0034] Because of the design of the cross section of the channel and/or the cross section of the first openings or discharge openings, it is possible to produce a throttling effect on individual filling materials from different chambers thereby allowing the quantity of the respective dispensed filling material to be adjusted very precisely. Flow differences in the case of different rheologies of the individual filling materials may also be equalized in this way.

[0035] According to a second aspect of the invention there is provided a method for producing a foil cartridge, in particular according to one of the preceding claims, with a foil tube and a cover featuring at least one first opening, having the following steps:

- Establishing at least one chamber by connecting the cover with the foil tube,
- Filling the chamber with a filling material through the first opening in the cover; and
- Sealing the first opening.

[0036] The foil cartridge is fabricated completely prior to being filled. Even any base that may be present is already used so that the chambers are completely sealed with the exception of the first opening and possibly an additional discharge opening. The filling material is filled into the chamber as a second step, which may be carried out in another machine than the fabrication of the empty foil cartridge. After the filling process, the first opening is sealed and thus the foil cartridge is hermetically sealed.

[0037] A head section described above with the receptacle for the mixing tube for dispensing the filling material may be firmly connected to the cover before the filling process or after the filling process.

[0038] If the filling process is carried out after placement of the head section, the channels between the cover and head section are also preferably filled with the filling material.

[0039] If the head section is positioned after the filling process, the filling process is carried out via the first opening, and said first opening is sealed after the filling process and before the head section is fastened.

[0040] If the filling process is carried out after placement of the head section, the first opening and/or the discharge opening may remain open, and only the openings (filling opening and outlet opening) in the head section are sealed.

[0041] If the cover has an additional discharge opening for each chamber, an additional filling opening is preferably provided flush with the first opening in the head section.

[0042] The filling process takes place advantageously via a filling lance, which is inserted into the first opening in the chamber, wherein an immersed filling process is carried out. As the fill level increases, the filling lance is retracted little by little during the filling process. Therefore, it is possible to fill the chambers so they are free of air bubbles. The filling process may be supported by a vacuum or counter pressure. This is particularly useful if the channels are also supposed to be filled up to the outlet opening.

[0043] The air in the chambers may escape through the discharge openings for example (if present). In the case of the filling process with a placed head section, it is also possible to design the filling opening in the head section with a smaller cross section than the first opening so that even though the filling lance fits tight at the filling opening, the air is able to escape from the chamber during the filling process due to the excess size of the first opening.

[0044] The foil cartridge is simple to open because it is possible to simply pull off the foil that is used as the closure without tools or it may be torn off in a defined manner with exertion of a certain force on the foil cartridge from outside from the dispensing tool. Because a defined opening always occurs, the forces required for the application process during opening and during dispensing of the filling material are always constant.

[0045] The invention will be described in the following on the basis of several exemplary embodiments making reference to the enclosed drawings, which show:

[0046] FIG. 1 A schematic top view of a foil cartridge according to the invention in accordance with a first embodiment;

[0047] FIG. 2 A schematic perspective view of a portion of the foil cartridge from Figure 1;

[0048] FIG. 3 A schematic sectional view of the upper portion of the foil cartridge from Figure 1;

[0049] FIG. 4 A schematic detailed view from Figure 3;

- [0050] FIG. 5 A schematic view of a closure for a foil cartridge according to the invention;
- [0051] FIGS. 6 and 7 A partition of a foil tube of a foil cartridge according to the invention shown schematically;
- [0052] FIG. 8 A schematic top view of a foil cartridge according to the invention in accordance with a second embodiment;
- [0053] FIG. 9 A schematic perspective view of a portion of the foil cartridge from Figure 8;
- [0054] FIG. 10 A schematic sectional view of the foil cartridge from Figure 8;
- [0055] FIG. 11 A detailed view from Figure 10;
- [0056] FIG. 12 A schematic view of a closure of a foil cartridge according to the invention;
- [0057] FIG. 13 A schematic top view of a foil cartridge according to the invention in accordance with a third embodiment;
- [0058] FIG. 14 A schematic perspective view of a portion of the foil cartridge from Figure 13;
- [0059] FIG. 15 A schematic view of a closure of a foil cartridge according to the invention;
- [0060] FIG. 16 A schematic sectional view of the foil cartridge from Figure 13;
- [0061] FIG. 17 A schematic top view of a foil cartridge according to the invention in accordance with a fourth embodiment;
- [0062] FIG. 18 A schematic perspective view of a portion of the foil cartridge from Figure 17;
- [0063] FIG. 19 A schematic sectional view of the foil cartridge from Figure 17; and

[0064] FIG. 20 A schematic detailed view from Figure 19.

[0065] Figure 1 shows a foil cartridge 100 in accordance with a first embodiment. The foil cartridge 100 in this case includes two foil reservoirs 102 as well as a head section 104 (see Figure 3). The head section 104 is connected on an upper axial end to each of the two foil reservoirs 102 that are arranged next to each other.

[0066] One of the foil reservoirs 102 is depicted in greater detail in Figure 2. A first, outer foil tube 106 is subdivided by a partition 108 (see Figures 6 and 7) into two parallel chambers 110, 112 that are separated from each other in the axial direction A. As Figures 6 and 7 show, the two chambers 110, 112 may be configured to be the same size or different sizes, which is achieved by the arrangement of the partition 108. Instead of a single partition 108, several partitions 108 could also be provided, which may extend in any desired manner through the cross section of the foil tube 106.

[0067] The foil tube 106 and the partition 108 in Figures 6 and 7 are fabricated of a single piece of foil. However, it would also be possible to use a foil tube with a closed circumference, for example produced by extrusion, and to introduce a partition 108 into the interior. Fastening the partition 108 on the foil tube 106 is carried out in this case by adhesion or welding using any suitable method.

[0068] The axial end of the foil tube 106 facing away from the head section 104 is sealed in this case by a base 114 (not shown). The base 114 here is a piece of foil, which is connected to the axial end of the foil tube 106 and of the partition 108 by adhesion or welding so that the chambers 110, 112 are hermetically sealed off from the environment on this end.

[0069] On the axial upper end, the chambers 110, 112 are sealed by a cover 116, which, like the base 114, is firmly connected to the foil tube 106 and the partition 108 by welding or adhesion. The foil tube 106, partition 108, base 114 and cover 116 delimit the chambers 110, 112 and enclose them completely.

[0070] However, several openings are configured in the cover 116, in this case, a first opening 118 for each chamber 110, 112 as well as a discharge opening 120 that is separate from said first openings. The cover 116 in this case is made of a relatively firm foil material. It may be more firm than the material that is used for the foil tube 106. The head section 104 in this case is fabricated of a more firm material than the cover 116 and

produces a dimensional stability for the entire axial upper end of the foil cartridge 100. In particular, the head section 104 makes sure that the diameter of the openings remains constant even when the foil cartridge 100 is used in a dispensing device (not shown).

[0071] Openings are also configured in the head section 104, specifically a central outlet opening 122 as well as a filling opening 124 for every chamber 110, 112 that is separate from the outlet opening 122, said filling openings being respectively flush with the first openings 118 in the cover 116. Figure 3 depicts the respective situation only for one chamber 112 of a foil reservoir 102. However, the head section 104 has only one common outlet opening 122 for all chambers 110, 112 and all foil reservoirs 102.

[0072] Channels 126 respectively guiding from one of the discharge openings 120 to the outlet opening 122 are configured between the inner wall of the head section 104 and the upper side of the cover 116.

[0073] The outlet opening 122 is arranged on a pipe-shaped receptacle 128, which forms a receptacle for a mixing tube for dispensing the filling material accommodated in the chambers 110, 112.

[0074] The dividing walls 130, which delimit the channels 126 in the interior between the walls of the head section 104 and the cover 116, extend directly to the outlet opening 122 so that it is effectively partitioned into as many channels 126 as chambers that are provided.

[0075] Before the foil cartridge 100 is used, the outlet opening 122 is tightly sealed by a closure 132. In the case depicted here, the closure 132 is a foil that has a weakened zone 134 for every chamber 110, 112, which is respectively arranged in the center above one of the channels 126 in the region of the outlet opening 122 (see Figure 5).

[0076] All the chambers 110, 112 are hermetically sealed off from the environment prior to use of the foil cartridge 100. Intermixing of the different filling materials in the individual chambers 110, 112 does not take place in this state.

[0077] The filling openings 124 are likewise tightly sealed by a closure 136. The closure 136 in this case is also a foil, which is printed with the product name, the filling materials contained in the individual chambers 110, 112, the lot number as well as the expiration date of the foil cartridge and thereby serves as the label for the foil cartridge 100.

[0078] It is also possible to use a metal plate or an injection molded part as the closure 136. In all cases, the closure 136 seals the filling openings 124 completely tight so that filling material is not able to exit from the chambers 110, 112.

[0079] In the head section 104, a filling channel 138 extends in this case from the edge of the filling opening 124 directly to the first opening 118 in the cover 116. In the region in which the filling channel forms the edge of the filling opening 124, said filling channel has a conical taper 140, which ends in a circumferential lip 142. The lip 142 defines the region with the smallest cross section of the filling channel 138.

[0080] When the foil cartridge 100 is manufactured, first the foil reservoir 102 is produced. To do so, a foil tube 106 made of a flat foil section or as a foil tube with a closed circumference is produced. Any partitions 108 are fastened in the foil tube 106. The base 114 is inserted at the lower axial end and adhered or fastened by ultrasonic, laser or thermal welding. The cover 116 is also fastened on the opposing axial end. In the process, the partitions 108 are also fastened on the base 114 and cover 116 so that individually self-contained chambers 110, 112 are formed. The first openings 118 and the discharge openings 120 are still open.

[0081] Next the head section 104 is firmly connected to the cover 116, for example by adhesion or welding.

[0082] Now the channels 126 between the cover 116 and head section 104 are also configured. The outlet opening 122 is also still open, just like the filling openings 124. The foil cartridge 100 is now ready for filling as a prefabricated product. This may be carried out in a different machine than the manufacturing.

[0083] Now a filling lance (not shown) is inserted into the respective chamber 110, 112 via the filling openings 124 and the first openings 118, and the specific filling material intended for the chamber 110, 112 is introduced. As the fill level increases, the filling lance is retracted little by little beginning from the base of the chamber 110, 112 so that an immersed filling process that is free of bubble takes place. The conical taper 140 causes the filling lance to be centered in the filling opening 124 and makes sure that the filling opening 124 is essentially sealed by the filling lance. The air escaping from the chamber 110, 112 escapes through the discharge opening 120 and the outlet opening 122. The filling lance is retracted little by little in the course of the filling process, wherein the lip 142 strips off excess filling material from the filling lance so that it does not get into the filling

device. Several lips 142 arranged axially in succession could be provided in the filling channel 138, wherein in this case only one is depicted.

[0084] The filling process is carried out until the filling material exits from the discharge openings 120 and the channels 126 are filled up to the exit opening 122.

[0085] The filling process may be supported by applying a vacuum to the exit opening 122 or establishing a counter pressure.

[0086] After the filling process is concluded, the exit opening 122 is tightly sealed with the closure 132. In doing so, the individual channels 126 are completely separated from one another.

[0087] The filling openings 124 are also tightly sealed with the closures 136. The first openings 118 and the discharge openings 120 remain unsealed in this example.

[0088] The finished foil cartridge 100 may be inserted in this form into a dispensing unit, wherein the pressure that is initially applied makes sure that the weakened zone 134 in the closure 132 of the outlet opening 122 tears. Already at this point time, the filling material exits from all chambers 110, 112 in the desired mixing ratio.

[0089] The closure 132 could also be designed so that it is pulled off by the user before insertion into the dispensing device.

[0090] The shape of the channels 126 and the size of the discharge openings 120 depends upon the filling material used in the chambers 110, 112 [and] is selected in such a way that either the openings and channels 126 are large enough for filling materials with larger fillers to flow out without being impeded or a throttling effect is realized for low-viscosity filling materials and/or those that are only required in small volumes. Each of the channels 126 may be configured differently with this in mind. The variation may be achieved by the shape of the head section 104 and the dividing walls 130.

[0091] In the depicted case, a four-component cartridge is realized in which each of the chambers 110, 112 of the two foil reservoirs 102 contains a different filling material. The filling materials first come into contact with one another when exiting outlet opening 122 and are mixed in the mixing tube placed there.

[0092] A second embodiment of a foil cartridge 200 is depicted in Figures 8 to 12.

[0093] The reference numbers already used are retained for components that are identical to those of the first embodiment.

[0094] In this case, the separate chambers 110, 112 and 113 are realized by a second foil tube 206 being inserted into the first foil tube 106. In addition, as in the first embodiment, another partition 108 is provided here, which is located between the wall of the first foil tube 106 and that of the second foil tube 206 so that three chambers are formed overall. It would also be possible to provide several second foil tubes 206 or to further subdivide these with partitions.

[0095] As in the first embodiment, each of the chambers 110, 112, 113 in the cover 216 is assigned a first opening 118.

[0096] This arrangement applies to both foil reservoirs 202 (see Figure 8).

[0097] In contrast to the first embodiment, in this case separate discharge openings are not provided. Correspondingly, the channels 226 in the head section 204 are configured in such a way that they lead from the first opening 118 to the outlet opening 122. Otherwise, the head section 204 is designed in a similar manner as the head section 104 in the first embodiment. The filling openings 124 in the head section 204 are provided with a conical taper 140 and a circumferential lip 142. In this case, however, the diameter of the first opening 118 is larger than the diameter of the filling channel 138 in the region of the lip 142 so that during the filling process the air is able to escape from the chamber that has just been filled.

[0098] Because three chambers 110, 112, 113 have been provided for each foil reservoir 202 in this case, the closure 132 of the outlet opening 122 is distributed with six weakened zones and the outlet opening 122 is subdivided into six channels 226.

[0099] As in the first embodiment, in order to fabricate the foil cartridge 200, first the foil reservoirs 202 are produced and then connected to the head section 204. The filling process of the individual chambers 110, 112, 113 takes place via the filling openings 124 in the head section 204 and the first openings 118 in the cover 216. Also in this case, it is possible for the filling process to take place until the filling material also fills the channels

126 up to the outlet opening 122. After the filling process, the closure 132 is applied to the outlet opening 122 and the closures 136 to the filling opening 124.

[00100] Different filling materials may respectively be accommodated in the individual chambers 110, 112, 113 so that a six-component mixture is produced. However, it is also possible to fill several of the chambers with the same filling material in order to achieve a higher mixing ratio. It is possible to realize mixing ratios of 1:1 to 1:50 without having to vary the outer geometry of the foil reservoirs 202.

[0100] Figures 13 to 16 show a third embodiment of a foil cartridge 300.

[0101] In contrast to the embodiments described so far, in this case first the foil reservoir 302 is filled before the head section 304 is fastened on the cover 316. The configuration and division of the two foil reservoirs 302 corresponds essentially to that of the first embodiment.

[0102] The head section 304 does not have any further openings besides the outlet opening 122. When the foil cartridge 300 is produced, first the foil reservoir 302 is fabricated. This is filled through the first openings 118, wherein the edge of the openings 118 may be configured in a manner similar to the above-described edge of the opening 124 with a conical taper and a sealing lip (see Figure 20). After the chambers 110, 112 have been completely filled, the first openings 118 are sealed with closures 340. The closures 340 in this case are configured in the form of a foil having a weakened zone 342, as depicted schematically in Figure 15. Afterwards, the head section 304 is firmly connected to the foil reservoirs 302, for example, by adhesion or welding. The closure 132 of the outlet opening 122 may be carried out before or after the head section 304 is applied to the foil reservoirs 302.

[0103] Figures 17 to 20 show a fourth embodiment of a foil cartridge 400.

[0104] In this case, as in the second embodiment, the chambers 110, 112, 113 are formed by an arrangement of a second foil tube 206 in the interior of the first foil tube 106. The design of the head section 404 and of the first openings 118, on the other hand, is like the third embodiment just described.

[0105] In this case as well, after the foil reservoirs 402 are manufactured, first the individual chambers 110, 112, 113 are filled and the first openings 118 are sealed with closures 440. Then the head section 404 is firmly connected to the cover 416.

[0106] In the last two embodiments, the channels 326, 426 are not filled with filling material prior to the use of the foil cartridges 300, 400.

[0107] As a result, it is also possible in the case of these embodiments to leave the outlet opening 122 unsealed.

[0108] This embodiment also shows that the first opening 118, which is used to fill the chambers 110, 112, 113, has a conical taper 140 in the region of its edge as well as a circumferential lip 142 for stripping the filling material off the filling lance.

[0109] In all embodiments, the channels 126 to 426 in the intermediate head section and cover are configured so that the filling material exiting from the individual chambers is not mixed until leaving the outlet opening 122.

[0110] The openings 118, 120, 122 and 124 may be respectively designed to be circular or elliptical.

[0111] The weakened zone may be realized in a linear, circular, cruciform or elliptical form with interrupted or continuous lines.

[0112] All features of the individual embodiments may be combined with one another or substituted for one another as desired at the discretion of a person skilled in the art.

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CLAIMS

1. Foil cartridge having a foil tube enclosing at least one chamber in the circumferential direction and a cover separate from the foil tube, said cover closing an axial end of the foil tube, wherein at least one first opening is configured in the cover for each chamber, through which opening the chamber may be filled with a filling material, and a closure, which seals the first opening.
2. Foil cartridge according to Claim 1, wherein several chambers are provided, which are separated from each other by a partition of the foil tube in the axial direction (A).
3. Foil cartridge according to Claim 1 or 2, wherein several chambers are provided, which are formed by at least one additional foil tube, which is arranged in the first foil tube so that the first foil tube extends parallel to the second foil tube.
4. Foil cartridge according to one of the preceding claims, wherein a head section is provided, which is firmly connected to the cover and which has an outlet opening provided on a receptacle for a mixing tube for dispensing the filling material.
5. Foil cartridge according to one of Claims 3 and 4, wherein at least one channel for guiding the filling material to the outlet opening is formed between the cover and an inner wall of the head section.
6. Foil cartridge according to one of the preceding claims, wherein a discharge opening separate from the first opening is provided for each chamber.
7. Foil cartridge according to one of the preceding claims, wherein the closure is a foil.
8. Foil cartridge according to one of the preceding claims, wherein the edge of the first opening in the cover and/or a filling opening in the head section have a conical taper.
9. Foil cartridge according to one of the preceding claims, wherein at least one lip is configured on the edge of the first opening in the cover and/or a filling opening in the head section.

10. Method for producing a foil cartridge, in particular according to one of the preceding claims, with a foil tube and a cover featuring at least one first opening, having the following steps:

- Establishing at least one chamber by connecting the cover with the foil tube,
- Filling the chamber with a filling material through the first opening in the cover and
- Sealing the first opening.

11. Method according to Claim 10, wherein a head section is provided, which has a receptacle for a mixing tube for dispensing the filling material and which is firmly connected to the cover before the filling process.

12. Method according to Claim 10, wherein a head section is provided, which has a receptacle for a mixing tube for dispensing the filling material and which is firmly connected to the cover after the filling process.

13. Method according to one of Claims 10 to 12, wherein the first opening is sealed by a closure placed directly on the first opening.

14. Method according to one of Claims 10 to 13, wherein the filling process takes place via a filling lance, wherein the filling lance is inserted through the first opening into the chamber and an immersed filling process is carried out.

15. Foil cartridge substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

16. A method for producing a foil cartridge substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

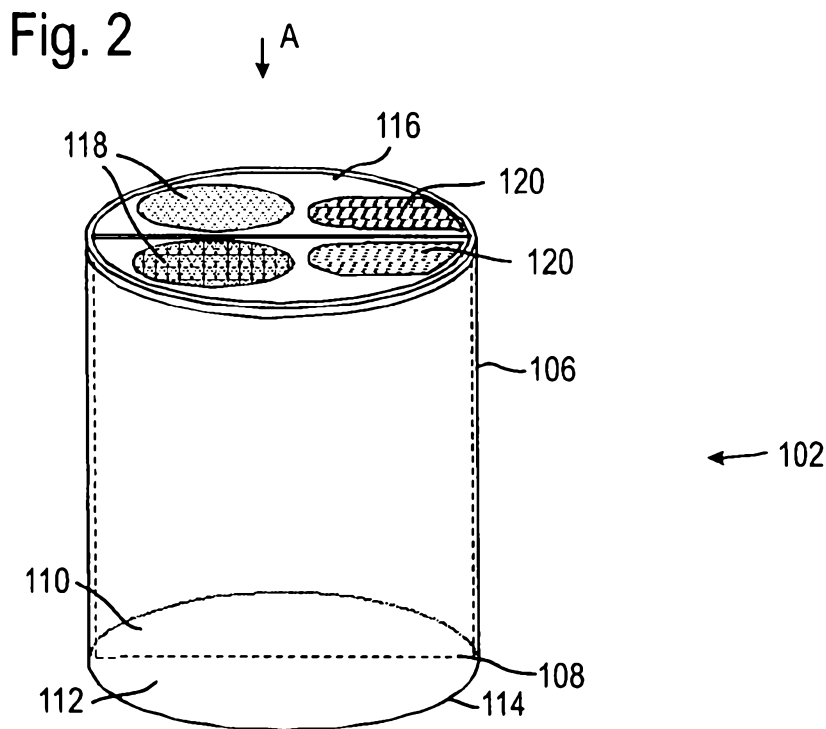
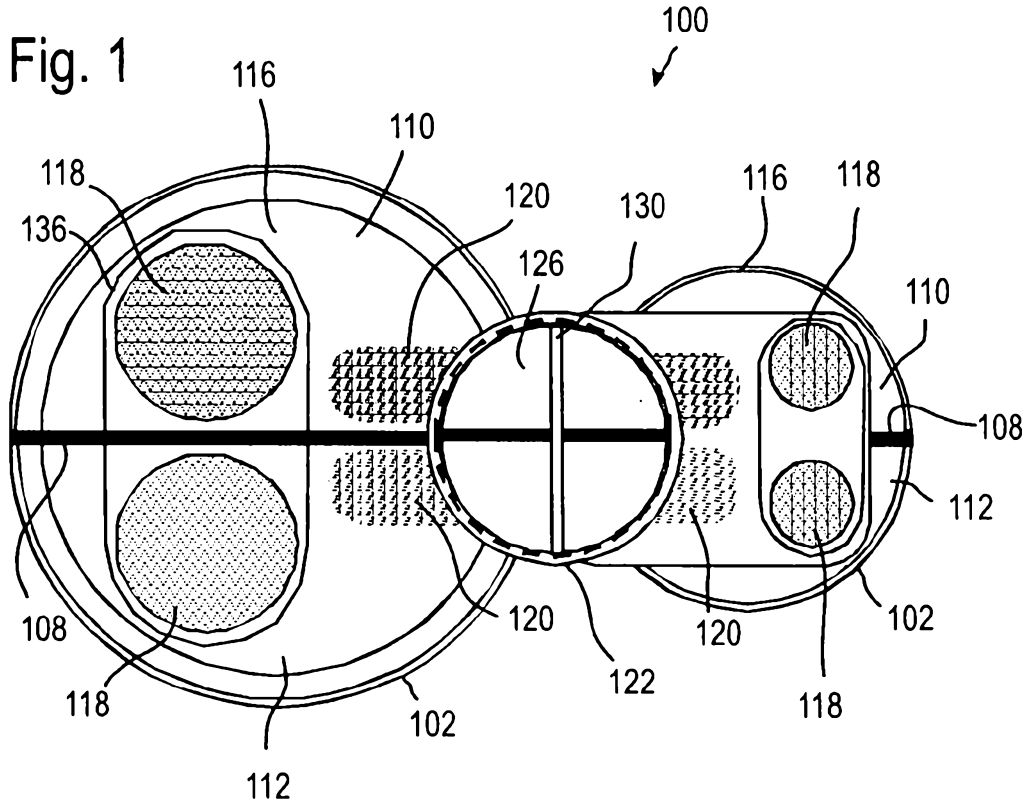


Fig. 3

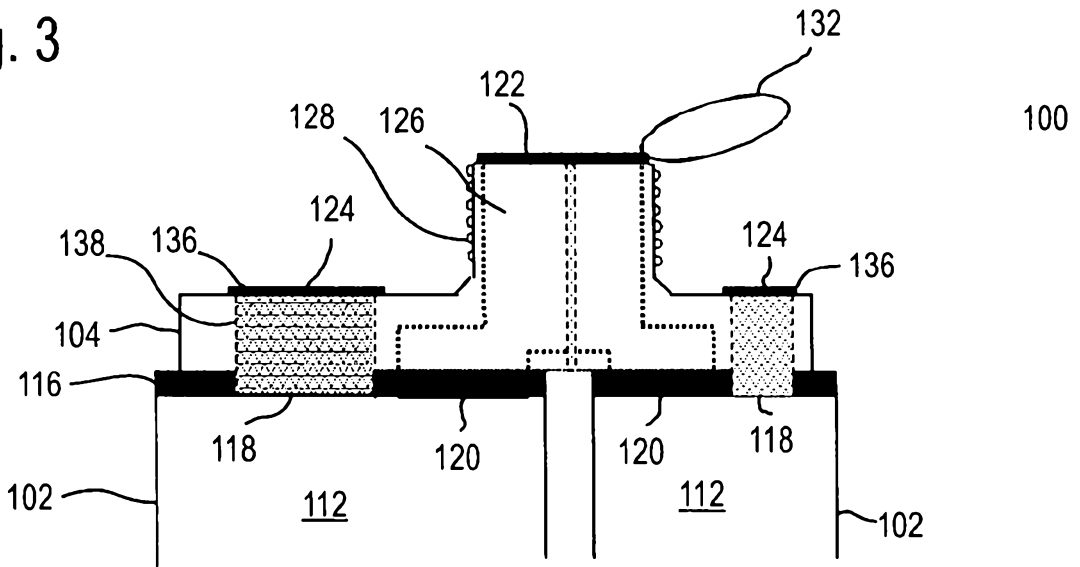


Fig. 4

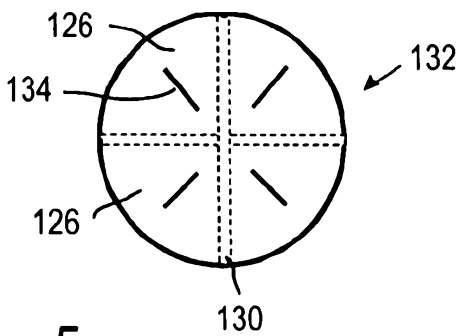
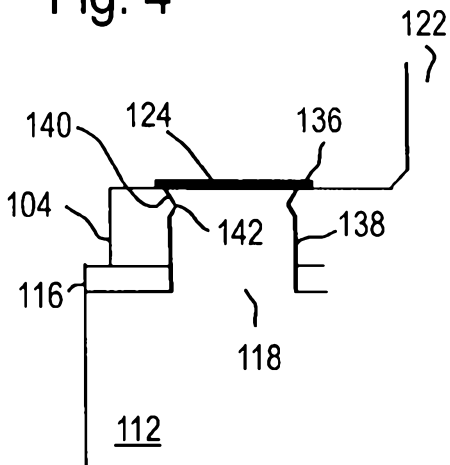


Fig. 5

Fig. 6

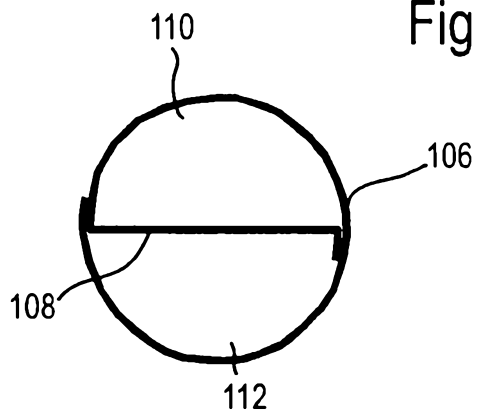


Fig. 7

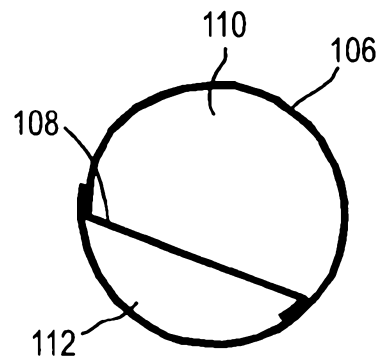


Fig. 8

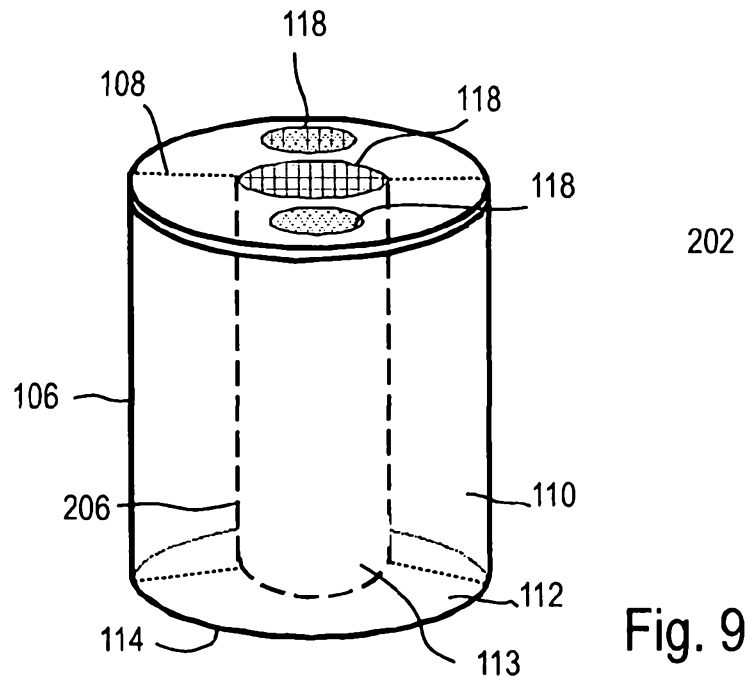
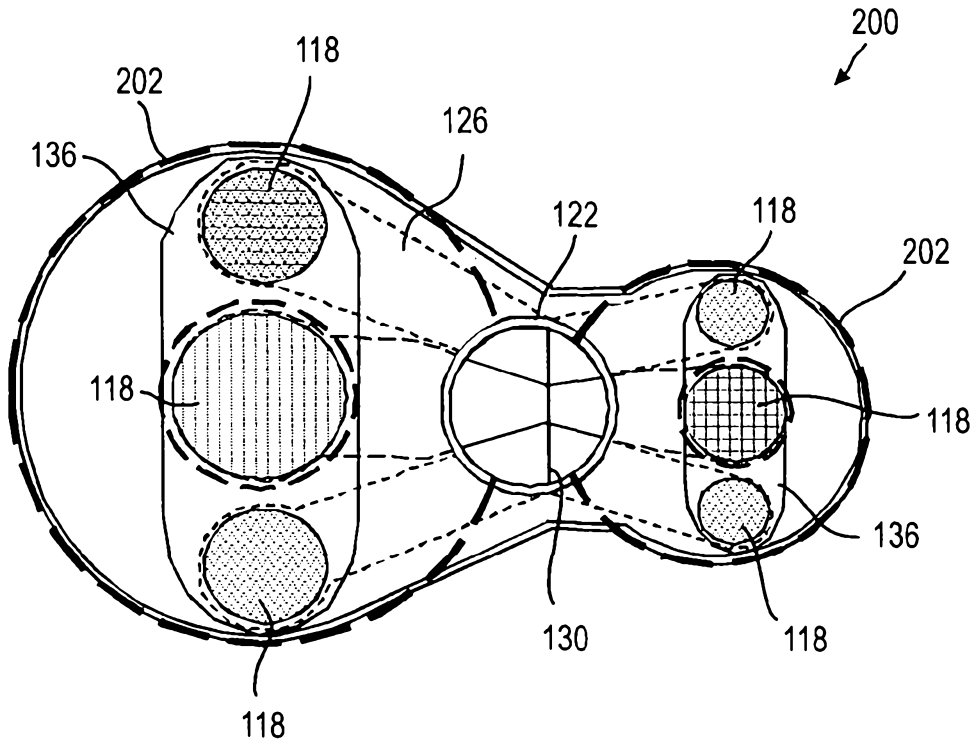


Fig. 9

Fig. 10

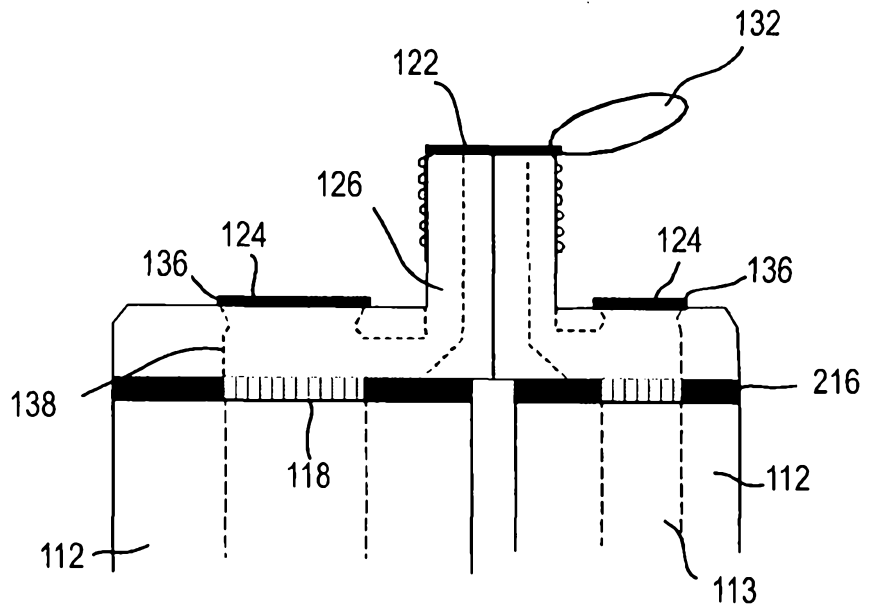


Fig. 11

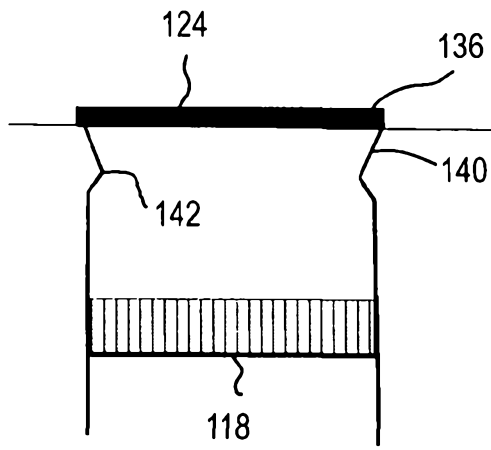
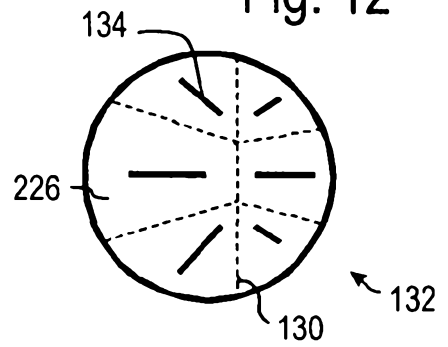


Fig. 12



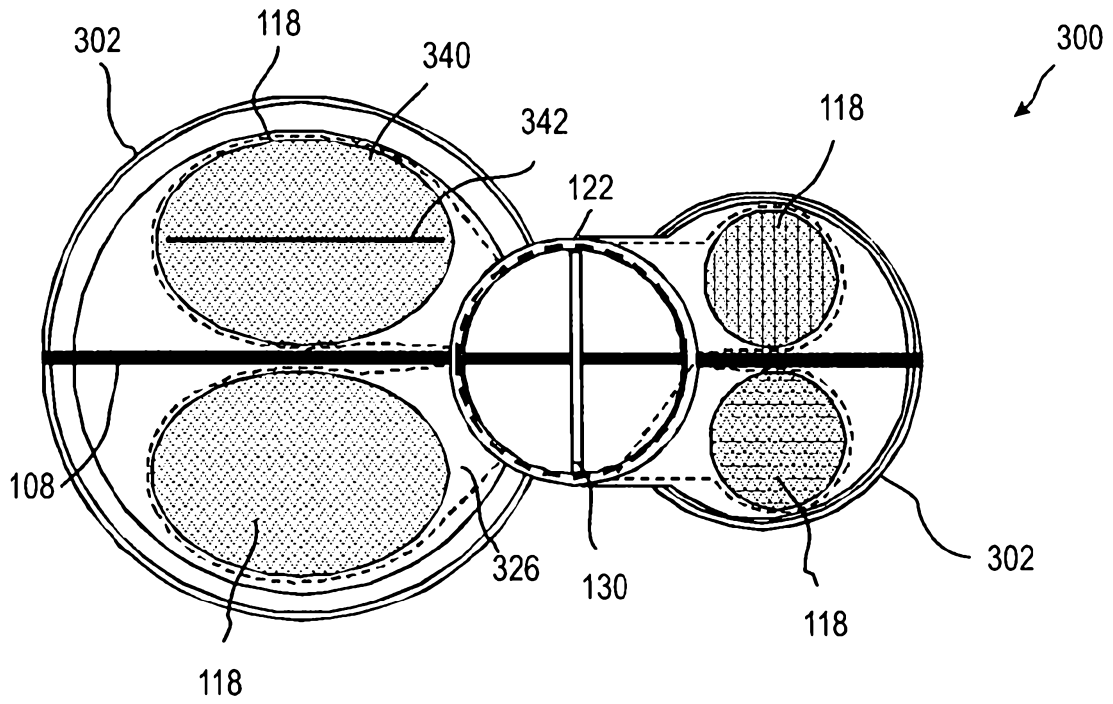


Fig. 13

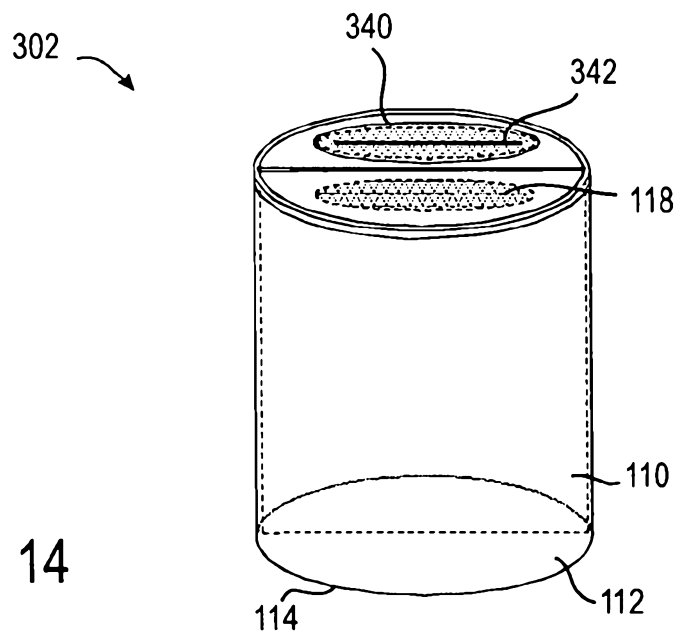


Fig. 14

Fig. 15

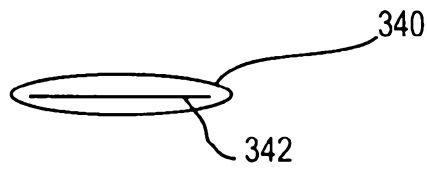
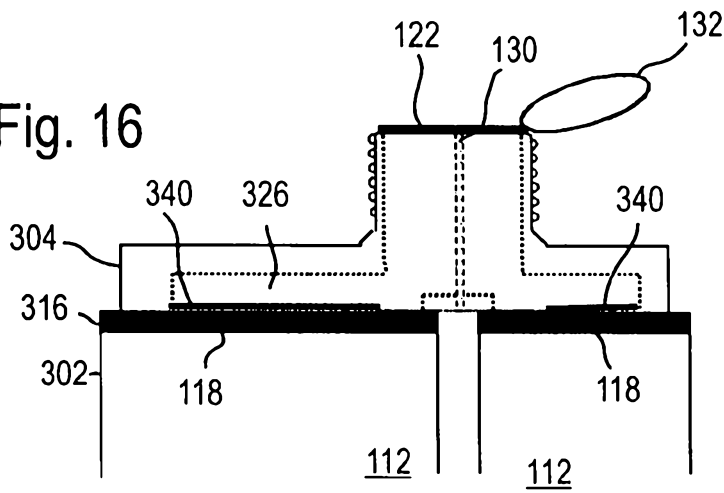


Fig. 16



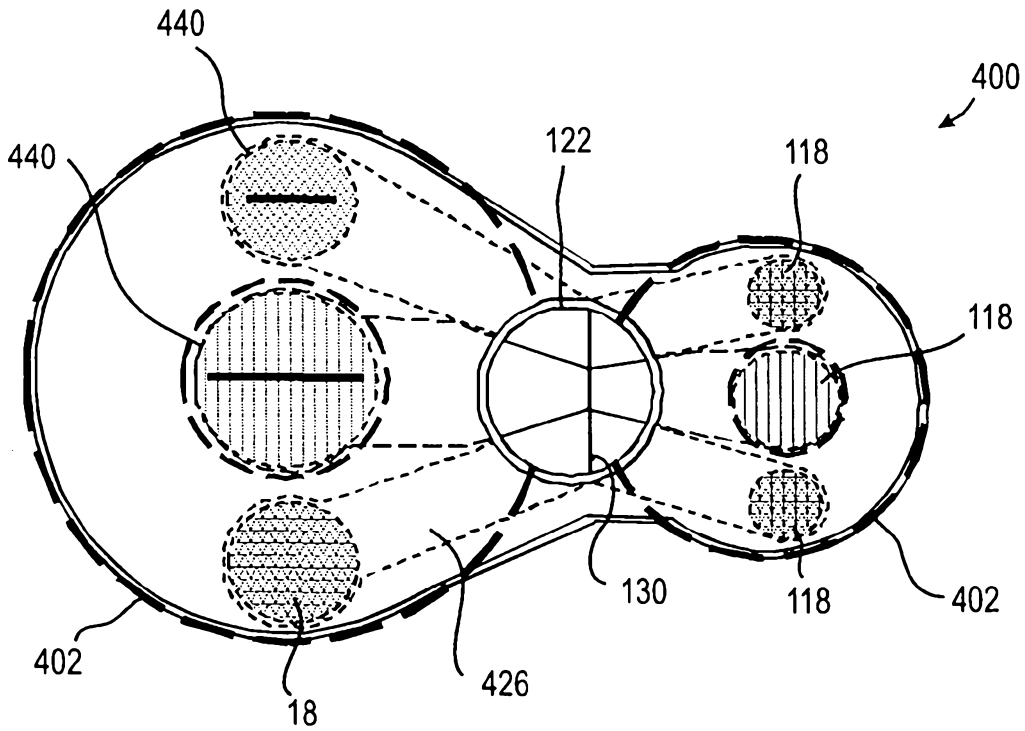


Fig. 17

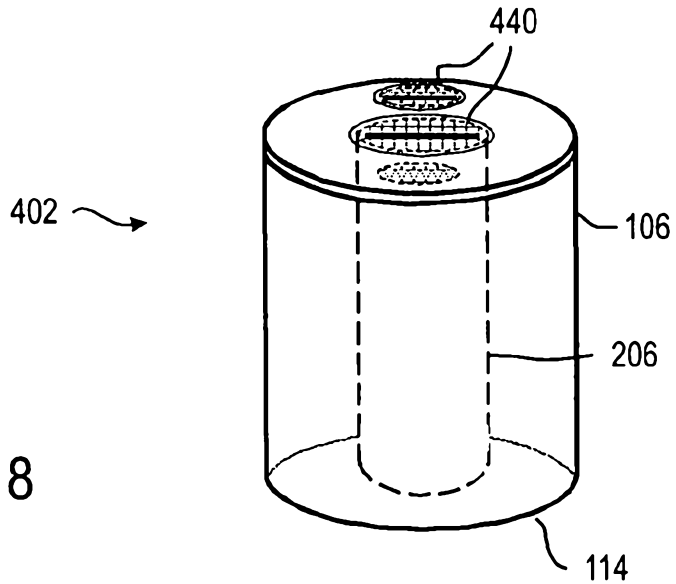


Fig. 18

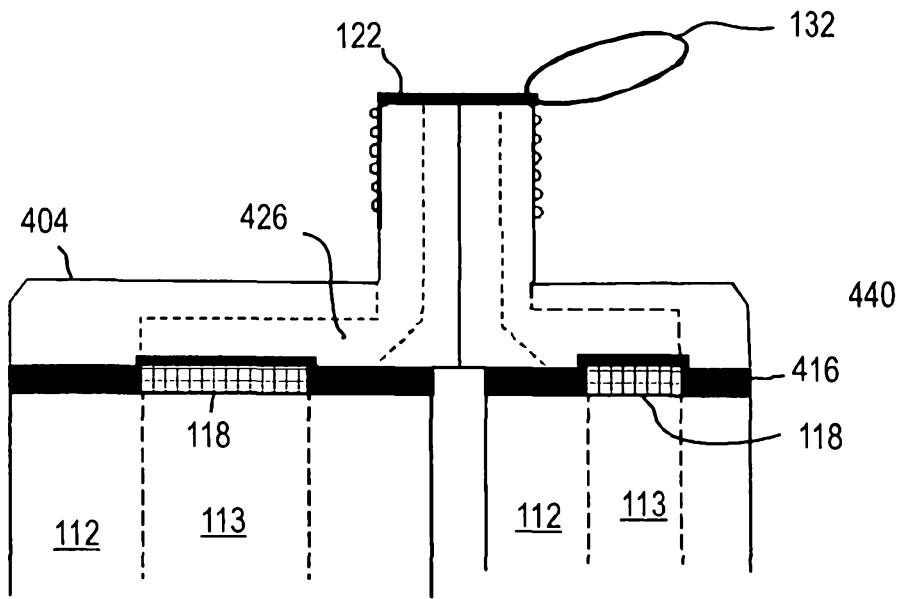


Fig. 19

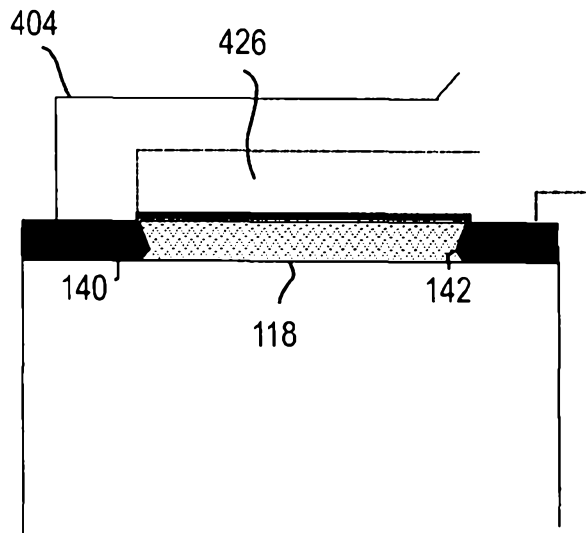


Fig. 20