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Remarks:

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(54) **CONTAINERS, APPARATUSES AND METHODS FOR MAKING CONTAINERS**

(57) An apparatus comprises advancing means for advancing along an advancing direction (F) sheet material (100) that is thermoformable through a forming station (2), in which there is provided forming means (3) arranged for deforming portions of the sheet material (100) so as to make shells (51, 52) of containers (50) joined by non-deformed parts of the sheet material (100), a filling

station (4) wherein the shells (51, 52) are filled with product (80), between the forming station (2) and the filling station (4) there being interposed an inserting station (5) comprising inserting means (6) for inserting a spatula element (40) in a respective shell (51, 52) so that a gripping portion (40a) of the spatula element (40) protrude from an edge (100d) of the sheet material (100).

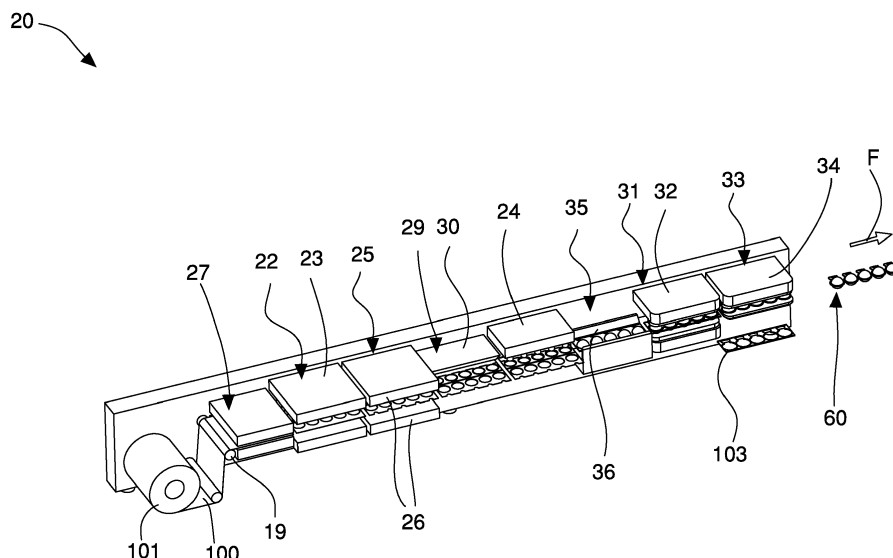


Fig. 13B

Description

[0001] The present invention relates to apparatuses and methods for making containers for products and containers thus obtained, in particular it refers to an apparatus and a method for thermoforming, filling with product and joining shells or parts of containers obtained from thermoformable sheet material by a hot deformation process.

[0002] Thermoformed containers are known for products comprising a base or lower shell, in which there is contained a prevalent portion of product, and a cover or upper shell coupled along a peripheral edge of the base, by welding or by means of mechanical coupling elements.

[0003] In such containers, the two shells can be thermoformed adjacent to one another and be joined together by a thin strip of plastics, that acts as an elastic hinge in the rotation movement that is necessary for superimposing the two shells.

[0004] In the case of packaging of food products, such as confectioner's custard, cheeses, yoghurt, etc, stiff inserts such as spatulas or spoons or other similar means can be inserted inside the containers, generally in the lower shell, that enable a user to make use of the product once the container has been opened.

[0005] Such stiff inserts are entirely contained inside the container.

[0006] An apparatus for manufacturing the above containers comprises an indexed advancing system for advancing thermoformable sheet material that is passed to a heating station and subsequently to a forming station in which it is plastically deformed to obtain a plurality of upper and lower shells of the containers. Thermoforming is performed so that a lower shell of each container is juxtaposed on the upper shell, which is intended for acting as a cover and is joined thereto by a portion of said sheet material.

[0007] After forming, an insert or spatula is inserted into each of the lower shells, which are subsequently filled with product in a dosing station.

[0008] At this point, the upper shells of each container are placed on the respective lower shells, folding the portion of the sheet as a hinge and are then mutually welded, respectively in a folding station and a welding station.

[0009] The set of filled containers thus obtained is then sent to a subsequent blanking station to obtain the single separated containers or subdivided groups, for example rows or stacks, connected together by strips of material.

[0010] A drawback of this manufacturing method and of the container thus obtained is that the spatula is completely contained inside the container filled with product, so that it is generally soiled with said product also in a gripping portion and thus it is no appropriate nor convenient for use by a user.

[0011] Another drawback consists in the fact that the step of introducing the spatula is very laborious and requires a proper operating station in the apparatus that is

able to remove the spatulas from a magazine and position the spatulas on a correct position inside the lower shells. If positioning of the spatulas is not correct, the subsequent welding of the container may be compromised with the result that said container is not hermetically closed. In addition to that, the closure may not be completely hermetic, also due to the fact that the material of the spatulas is not weldable to that of the container.

[0012] Further, the spatulas or stiff inserts have a unit cost, comprising production, transport and handling that is comparable to that of the finished container and is therefore relatively high.

[0013] An object of the present invention is to improve known machines and methods for making containers by forming thermoformable sheet material.

[0014] Another object is to provide an apparatus and a method for forming, filling and subsequently welding containers obtained from sheet material and provided internally with stiff inserts such as spatulas or similar means for making use of a product dosed therein.

[0015] A further object is to improve known containers provided internally with stiff inserts or spatulas, in particular by increasing the degree of protection of the contained product and lowering manufacturing costs.

[0016] Still another object is to make containers that are easy, practical and hygienic for a user to use.

[0017] In a first aspect of the invention there is provided an apparatus, comprising means for advancing along an advancing direction a sheet material that is thermoformable through a forming station, in which there is provided forming means arranged for deforming portions of said sheet material so as to make shells of containers joined by non-deformed parts of said sheet material, a filling station in which said shells are filled with product, characterised in that between said forming station and said filling station there is interposed an inserting station comprising inserting means for inserting spatula elements into respective shells so that gripping portions of said spatula elements protrude from an edge of said sheet material.

[0018] The forming means makes on the sheet material a plurality of first shells and of second shells, arranged in two respective rows that are parallel to the advancing direction and separated by a folding line that longitudinally divides the sheet material into a first part and into a second part that are adjacent to one another.

[0019] The first shells juxtaposed on the second shells form respective pairs of shells intended for forming, once they are superimposed and joined, a respective container.

[0020] Each spatula element comprises an operating portion, opposite the gripping portion and inserted into a respective shell of each pair of shells. The product is dosed inside the shell containing said operating portion, having a shape that is substantially complementary to that of said shell in order to receive said product.

[0021] Downstream of the filling station there is arranged a folding station in which the sheet material is

folded along the folding line to place the second part of the sheet material on the first part, i.e. the first shells on the respective second shells. This enables containers to be formed that consist of two opposite shells that enclose, in a respective chamber, the operating portion of the spatula element and the dosed product.

[0022] After the folding station a joining station is provided in which the shells of each container are joined by welding at a surrounding portion of said shells.

[0023] After welding the containers that are thus formed are separated from the sheet material. Each container obtained has, in addition to the welded surrounding portion, a pair of tabs that are made at the gripping portion of the spatula element and are opposite one another with respect to the gripping portion. These tabs, which are separated from one another and are not welded, belong respectively to the first part and to the second part of the sheet material and in use can be easily grasped by the fingers of a user in order to separate the first shell from the second shell and open the container.

[0024] In a second aspect of the invention, there is provided a method comprising advancing along an advancing direction a sheet material that is thermoformable, forming said sheet material deforming portions thereof so as to make shells of containers joined by non-deformed parts of said sheet material, filling said shells with product, characterised in that before said filling there is provided inserting spatula elements into said shells so that gripping portions of said spatula elements protrude from an edge of said sheet material.

[0025] Owing to these aspects of the invention, it is possible to obtain containers provided internally with spatulas, or similar stiff inserts, that are particularly easy, convenient and hygienic for a user to use. The spatula element of each container is in fact provided with an operating portion, intended for coming into contact with the mouth of the user, which is completely contained inside the container and hermetically closed therein. The gripping portion is not in contact with the dosed product inside the container, but protrudes from the latter and is conveniently available for the user. It is thus possible to increase the use convenience and flexibility of the container whilst at the same time maintaining a high degree of protection of the contained product and limiting manufacturing costs.

[0026] In a third aspect of the present invention, there is provided a container having wall means made by deforming sheet material that is thermoformable, comprising a first shell and a second shell, superimposed on one another and joined at a surrounding portion to form a chamber, and a spatula element inserted into said chamber, characterised in that said spatula element is inserted so that a gripping portion thereof protrudes from said chamber.

[0027] In a fourth aspect of the invention there is provided an apparatus comprising means for advancing along an advancing direction a sheet material that is thermoformable through a forming station comprising form-

ing means arranged for deforming portions of said sheet material so as to make shell means of containers, characterised in that it comprises blanking means for blanking further portions of said sheet material and making spatula means to be inserted into said shell means.

[0028] The forming means makes on the sheet material a plurality of first shells, second shells and hollows or cavities arranged on three respective rows that are adjacent and parallel to the advancing direction of the sheet material along the apparatus and separated by lines that longitudinally divide the sheet into three adjacent parts.

[0029] In particular, a first separating line longitudinally divides a first central part containing the row of the first shells from a second part that is adjacent and contains the row of the cavities. A second separating line longitudinally divides the first part from a third part that is adjacent and contains the row of the second shells.

[0030] The cavities have concavities opposite those of the first shells and of the second shells, with respect to a plane defined by said sheet material and are formed in portions of the sheet material that are intended to be cut in a first blanking station to form operating portions of respective spatula elements that will be subsequently formed.

[0031] After forming, the sheet material undergoes a first blanking that enables the aforesaid operating portions to be cut that are subsequently folded inside corresponding first shells.

[0032] A filling station enables a product to be dosed inside the cavities and/or the first shells.

[0033] After filling, the sheet material is further folded so as to superimpose the second shells on the first shells, thus enclosing in a chamber the operating portions of the spatula elements and the dosed product.

[0034] A joining station joins together the shells and hermetically closes the container by a welding, for example by a peelable welding. In particular, welding means performs a welding along a surrounding portion of the shells having a substantially annular shape.

[0035] After welding, a second blanking enables to separate from the sheet material the containers that have thus been formed and the respective spatula elements inserted partially into said containers.

[0036] Each container obtained has, in addition to the welded surrounding portion, a pair of tabs that are superimposed and not welded, that are connected respectively to the first shell and to the second shell. Each spatula element that is thus obtained has a gripping portion that is outside the container and is connected to the operating portion.

[0037] A user, by retaining the gripping portion of the spatula element and grasping and pulling one of the tabs, is able to open the container and separate the two shells.

[0038] In a fifth aspect of the invention, there is provided a method comprising advancing along an advancing direction a sheet material that is thermoformable, forming said sheet material deforming portions thereof so as to

make shell means of containers, inserting into said shell means spatula means, characterised in that before said inserting there is provided cutting further portions of said sheet material for making said spatula means.

[0039] Owing to these aspects of the invention it is possible to make containers in a simple and cheap manner that are provided internally with spatulas, stiff inserts or similar elements for making use of a product dosed therein.

[0040] The spatula element of each container is in fact obtained from the same sheet material that is thermoformable on which the shells that constitute the container are made. The spatula element is inserted directly into the respective container during the manufacturing process. This enables the use of an inserting station for removing spatula elements from a magazine and depositing the spatula elements in the shells of the sheet material to be avoided.

[0041] It is further possible to make a complete and hermetic welding as the material of the spatula element and the material of the shells come from the same sheet material. The complete welding along a surrounding portion of each shell ensures the wholeness of the product inside the shell and further maintains the hygiene of the operating portion of the spatula element intended for coming into contact with the mouth of the user.

[0042] In a sixth aspect of the present invention, there is provided a container having wall means made by deforming a sheet material that is thermoformable, comprising at least a shell closed by closing means so as to form a chamber, and a spatula element partially inserted into said chamber, characterised in that said spatula element is made by blanking said sheet material.

[0043] In a seventh aspect of the invention there is provided an apparatus comprising means for advancing along an advancing direction a first sheet material that is thermoformable and a second sheet material that is thermoformable through a forming station comprising forming means arranged for deforming at least portions of said first sheet material so as to make shell means of containers, further comprising blanking means for blanking portions of said second sheet material and making spatula means to be inserted into said shell means.

[0044] In an eighth aspect of the invention there is provided a method comprising advancing along an advancing direction a first sheet material that is thermoformable and a second sheet material, forming said first sheet material deforming portions thereof so as to make shell means of containers, inserting into said shell means spatula means, characterised in that before said inserting there is provided cutting portions of said second sheet material for making said spatula means.

[0045] Owing to these aspects of the invention, it is possible to make containers in a simple and cheap manner that are provided internally with spatulas, stiff inserts or similar elements for making use of a product dosed therein.

[0046] The spatula element of each container is in fact

manufactured at the same time as the container into which it will be inserted during the manufacturing process. This enables the use of an inserting station for removing spatula elements from a magazine and depositing the spatula elements in the shells of the sheet material to be avoided.

[0047] In addition to that, the use of two different sheet materials enables containers and spatula elements to be manufactured that have different features, for example different thicknesses. A greater thickness may in fact be required for the second sheet material to make spatula elements that are stiffer and tougher and therefore more comfortable and efficient to use. At the same time, a first sheet material with a thinner thickness can be used, for example, for forming more easily shells of complex shapes and/or for obtaining a lighter container with a saving in material.

[0048] In a ninth aspect of the invention there is provided a container having wall means made by deforming a first sheet material that is thermoformable, comprising at least a shell closed by closing means so as to form a chamber, and a spatula element partially inserted into said chamber, characterised in that said spatula element is made by blanking a second sheet material that is thermoformable.

[0049] The invention can be better understood and implemented with reference to the attached drawings that illustrate some embodiments thereof by way of non-limiting example, in which:

Figure 1A is a schematic front view of an apparatus for making containers according to the invention; Figure 1B is a perspective view of the apparatus in Figure 1A;

Figures 2A, 2B, 2C are respectively front, plan and perspective views of a thermoformed sheet material with shells of containers;

Figures 3A, 3B, 3C are respectively front, plan and perspective views of the sheet material in Figure 2A, in which spatula elements are inserted into respective shells of said sheet material;

Figures 4A, 4B, 4C are respectively front, plan and perspective views of the sheet material in Figure 3A folded along a longitudinal folding line;

Figures 5A, 5B, 5C are respectively front, plan and perspective views of the folded sheet material of Figure 4A welded at surrounding portions of said superimposed shells;

Figure 6A is an enlarged plan view of a row of separated containers, obtained by blanking the sheet material in Figure 5A;

Figure 6B is an enlarged plan view of a row of containers that are joined together by connecting strips, obtained by blanking the sheet material in Figure 5A;

Figure 7 is an enlarged plan view of the sheet material in Figure 3A subjected to a transverse cut;

Figures 8A, 8B, 8C illustrate respectively front, plan and perspective views of a container in Figure 6A in

a close condition;

Figure 9 is a section along plane IX-IX of Figure 8B;
Figures 10A, 10B, 10C illustrate respectively front,
plan and perspective views of a container in Figure
6A in an open condition;

Figure 11 is a section along plane XI-XI of Figure
10B;

Figures 12A, 12B, 12C illustrate respectively front,
plan and perspective views of a version of the con-
tainer in Figure 6A in an open condition;

Figure 13A is a schematic front view of another em-
bodiment of the apparatus for making a respective
embodiment of container according to the invention;
Figure 13B is a perspective view of the apparatus in
Figure 13A;

Figures 14A, 14B, 14C are respectively front, plan
and perspective views of a thermoformed sheet ma-
terial with shells of containers, spatula elements and
longitudinal folding lines;

Figures 15A, 15B, 15C are respectively front, plan
and perspective views of the sheet material in Figure
14A subjected to a first blanking to make operating
portions of said spatula elements;

Figures 16A, 16B are respectively front and perspec-
tive views of the sheet material in Figure 15A partially
folded along a first folding line;

Figures 17A, 17B, 17C are respectively front, plan
and perspective views of the sheet material in Figure
15A completely folded along the first folding line;

Figures 18A, 18B, 18C are respectively front, plan
and perspective views of the sheet material in Figure
17A folded along a second folding line;

Figures 19A, 19B, 19C are respectively front, plan
and perspective views of the sheet material in Figure
18A welded at the superimposed shells;

Figures 20A, 20B, 20C are respectively front, plan
and perspective views of a row of separated contain-
ers, obtained by blanking the sheet material in Figure
19A;

Figures 21A, 21B, 21C are respectively front, plan
and perspective views of a row of containers joined
together by connecting strips, obtained by blanking
the sheet material in Figure 19A;

Figures 22A, 22B, 22C illustrate respectively front,
plan and perspective views of a container in Figure
20A in a close condition;

Figure 23 is a section along plane XXIII-XXIII of Fig-
ure 22B;

Figure 24A, 24B, 24C illustrate respectively front,
plan and perspective views of a container in Figure
20A in an open condition;

Figure 25 is a section along plane XXV-XXV in Figure
24B;

Figures 26A, 26B, 26C illustrate respectively front,
plan and perspective views of a version of the con-
tainer in Figure 20A in an open condition;

Figure 27 is a section along plane XXVII-XXVII in
Figure 26B;

Figure 28 is a front view of a further embodiment of
the apparatus for making a respective embodiment
of container according to the invention;

Figures 29A, 29B, 29C are respectively front, plan
and perspective views of a thermoformed sheet ma-
terial with shells of containers, the thermoformed
sheet material being divided into two parts by a lon-
gitudinal folding line;

Figures 30A, 30B are respectively plan and perspec-
tive views of the sheet material in Figure 29A sub-
jected to a first blanking to make operating portions
of spatula elements;

Figure 31 is a perspective view of the sheet material
in Figure 30A partially folded along the longitudinal
folding line;

Figures 32A, 32B, 32C are respectively front, plan
and perspective views of the sheet material in Figure
30A completely folded along the longitudinal folding
line;

Figures 33A, 33B are respectively plan and perspec-
tive views of the folded sheet material in Figure 32A
on which further sheet material is superimposed;

Figures 34A, 34B, 34C are respectively front, plan
and perspective views of the sheet materials in Fig-
ure 33A welded at the shells;

Figures 35A, 35B, 35C are respectively front, plan
and perspective views of a row of separated contain-
ers, obtained by blanking the sheet materials in Fig-
ure 34A;

Figures 36A, 36B are respectively enlarged plan and
perspective views of a container in Figure 35A in a
close condition;

Figure 37 is a section along plane XXXVII-XXXVII in
Figure 36A;

Figure 38 is a perspective schematic view of a still
another embodiment of the apparatus for making a
respective embodiment of container according to the
invention;

Figures 39A, 39B are respectively plan and perspec-
tive views of a first sheet material and of a second
sheet material that are respectively thermoformed
with shells of containers and cavities of spatula ele-
ments;

Figure 40 is a perspective view of the sheet materials
in Figure 39A, wherein the second sheet material is
subjected to a first blanking to make operating por-
tions of spatula elements;

Figure 41 is a perspective view of the second sheet
material in Figure 40 superimposed on a part of the
first sheet material;

Figures 42A, 42B are respectively plan and perspec-
tive views of the first sheet material in Figure 41 fold-
ed along a longitudinal folding line;

Figure 43 is a plan view of the sheet materials in
Figure 42A welded at the shells;

Figure 44 is a perspective view of a container ob-
tained by blanking the welded sheet materials of Fig-
ure 43, in an open condition;

Figure 45 is a schematic and partial front view of another further embodiment of the apparatus for making a respective embodiment of container according to the invention;

Figures 46A, 46B are respectively plan and perspective views of a first sheet material and of a second sheet material respectively thermoformed with shells of containers and blanked to obtain operating portions of spatula elements;

Figure 47 is a perspective view of a third sheet material that is partially illustrated and superimposed on said second sheet material and on said first sheet material;

Figure 48 is a perspective view of the sheet materials in Figure 47 welded at the shells;

Figure 49 is a perspective view of a container obtained by blanking the welded sheet materials in Figure 48, in a close condition.

[0050] With reference to Figures 1A and 1B, there is illustrated an apparatus 1 for making and filling with product 80 containers 50 obtained by thermoforming sheet material 100 that is thermoformable, for example plastics.

[0051] Said sheet material 100 is unwound from a reel 101 and moved, for example in an indexed manner, by advancing means 19 along an advancing direction F through a plurality of operating stations indicated below:

- a heating station 7 where heating means 8 heats the sheet material 100 to a temperature near the softening temperature;
- a forming station 2 in which forming means 3 deforms portions of the sheet material 100 for forming concave shells 51, 52 having a desired shape;
- an inserting station 5 into which inserting means 6 inserts spatula elements 40 into the shells 51, 52 so that gripping portions 40a of said spatula elements 40 protrude from a longitudinal edge 100d of said sheet material 100;
- a filling station 4 in which the shells 51 receive a product 80 to be packaged;
- a folding station 9 in which folding means 10 folds a part 100b of said sheet material 100 until the part 100b is superimposed on the remaining part 100a;
- a welding station 11 in which welding means 12 closes the shells 51, 52 containing the product 80; and
- a blanking station 13 in which blanking means 14 separates from the sheet material 100 formed, filled and closed containers 50.

[0052] The forming means 3 may comprise mechanical forming means, such as funnel means, and/or pneumatic forming means, such as pressurised air-dispensing nozzles, or suction nozzles for vacuum forming, or still others.

[0053] The forming means 3 makes on the sheet material 100 a plurality of first shells 51 and second shells 52, that form respective concave cavities, said shells be-

ing arranged on two respective rows that are parallel to the advancing direction F and separated by a line S that longitudinally divides the sheet material 100 in a first part 100a and in a second part 100b that are adjacent to one another (Figure 2B).

[0054] The line S can be an ideal folding line, or an incision made on the sheet material 100 to promote the folding thereof by placing a part of the sheet material on the other, as will be better explained further on in the description.

[0055] The first shells 51 juxtaposed on the second shells 52 form respective pairs of shells 51, 52 intended for forming a chamber 58 of a respective container 50 once they are superimposed and joined.

[0056] The first shells 51 may constitute the bases of the respective containers 50, whilst the second shells 52 may constitute the corresponding covers or closing elements of the containers 50.

[0057] The line S constitutes a folding line along which the sheet material 100 is folded, through the folding means 10 to place the plurality of second shells 52 on the plurality of first shells 51.

[0058] As shown in Figure 7, before the folding means 10 rotates the second part 100b of the sheet material 100 by 180° around the line S to place the second part 100b on the first part 100a, the sheet material 100 is cut by cutting means that is of known type and is not illustrated, along a line T that is transverse, in particular orthogonal, to the advancing direction F and which traverses the second part 100b coming from a remaining longitudinal edge 100e of said sheet material 100 at least as far as the folding line S.

[0059] After the forming station 2 there is provided the inserting station 5 comprising inserting means 6 arranged for removing spatula elements 40 from a magazine and depositing the spatula elements 40 on the respective first shells 51 of the sheet material 100. Said inserting means 6 is configured so as to insert an operating portion 40b of each spatula element 40 into the respective first shell 51, the gripping portion or handle 40a of said spatula element 40 protruding outside said longitudinal edge 100d of the sheet material 100.

[0060] As illustrated in particular in Figure 9, the operating portion 40b has a concave shape that is substantially complementary to that of the first shell 51 and has slightly smaller dimensions to be contained in the inside thereof.

[0061] The spatula elements 40 are made of stiff plastic, made, for example, by an injection process.

[0062] Between the inserting station 5 and the folding station 9 there is interposed the filling station 4 in which the first shells 51 and/or the operating portions 40b of the respective spatula elements 40 inserted therein are filled with product 80.

[0063] Downstream of the folding station 9, there is provided the joining station 11, in particular a welding station in which the welding means 12 performs a welding, for example a peelable welding, between the first

part 100a of the sheet material 100 and the second part 100b of the sheet material 100 folded on said first part 100a. In particular, the welding means 12 performs welding on a surrounding portion 55 of the shells 51, 52, said surrounding portion 55 having a substantially annular shape and an almost constant width. The welding on the surrounding portion 55 is interrupted at a portion 56 of a size such as to let the gripping portion 40a protrude from the spatula element 40. The plastic material with which the spatula element 40 is made is not, in fact, heat weldable to the sheet material 100 (Figure 8C). Nevertheless, during the welding process the material of the two portions 100a, 100b of the sheet material 100 at the gripping portion 40a is deformed locally so as to adhere almost sealingly to surfaces of said gripping portion 40a.

[0064] In the blanking station 13, the blanking means 14 performs a form blanking and separates the containers 50 that are thermoformed, filled and closed by the sheet material 100. The containers 50 that are thus obtained are moved outside the apparatus 1 in the advancing direction F, whilst the chips and rejects of blanking 103 are conveyed to a collecting container.

[0065] The blanking means 14, which is of known type and is not illustrated in detail, can be of the heat-formed blank, punch-die or longitudinal and transverse cutting blade type. With reference to Figure 6A, the blanking means can be configured so as to obtain from the sheet material 100 a plurality of separate and distinct containers 50. Each container 50 thus obtained has, in addition to the surrounding portion 55, that is welded, a pair of tabs or fins 53, 54 made at the gripping portion 40a of the spatula element 40, and opposite one another with respect to the latter.

[0066] A first tab 53 belongs to the first part 100a and is connected to the first shell 51, a second tab 54 belongs to the second part 100b and is connected to the second shell 51. Each tab 53, 54 comprises, for example, two lobes or portions 53a, 53b, 54a, 54b that are opposite one another with respect to the gripping portion 40a of the spatula element 40.

[0067] The two tabs 53, 54 can easily be grasped by the fingers of a user in order to separate the first shell 51 from the second shell 52 and open the container 50 (Figures 10A, 10B, 10C, 11).

[0068] Alternatively, the blanking means 14 can be shaped so as to separate from the sheet material 100 a row of containers 50 that are joined together by connecting strips 102 at the surrounding portions 55 (Figure 6B).

[0069] The opening of the container 50 is complete, the two shells 51, 52 being completely separable and detachable from one another.

[0070] In an embodiment of the container 50' illustrated in Figures 12A, 12B, 12C, the blanking means 14 is arranged for blanking the sheet material 100 so as to include in each container 50' a portion 57 of the sheet material 100 folded along the line S that connects the first portion 100a and the second portion 100b. This connecting portion 57 acts as a hinge between the two shells 51,

52 that in the opening of the container 50 remain mutually linked.

[0071] Alternatively, the aforesaid connecting portion 57 can be made by welding performed by the welding means 12.

[0072] With reference to Figures 13A and 13B, there is illustrated another embodiment of the apparatus 20 that is suitable for making and filling with product 80 containers 60 obtained by thermoforming from a sheet material 100 unwound from a reel 101 and moved, for example in an indexed manner, by advancing means 119 along the advancing direction F. The containers 60 are provided internally with respective spatula elements 70.

[0073] This embodiment of apparatus 20 comprises in sequence the operating stations listed below:

- a heating station 27 where heating means 28 heats the sheet material 100 to a temperature near the softening temperature;
- a forming station 22 in which the forming means 23 deforms portions of the sheet material 100 to form shells 61, 62 having a desired shape;
- a first blanking station 25 in which first blanking means 26 makes operating portions 63 of spatula elements to be formed;
- a first folding station 29 in which first folding means 30 folds a part 100b of said sheet material 100 until the part 100b is superimposed on another part 100a;
- a filling station 24 in which shells 61 receive a product 80 to be packaged;
- a second folding station 35 in which second folding means 36 folds a further part 100c of said sheet material 100 until the further part 100c is superimposed on the previously folded parts 100a, 100b;
- a joining station 31 in which said parts 100a, 100b, 100c are joined together; and
- a second blanking station 33 where second blanking means 34 separates from the sheet material 100 containers 60 that are formed, filled and closed and provided with spatula elements partially inserted therein.

[0074] The forming means 23, substantially similar to those disclosed in the preceding embodiment of the apparatus, makes on the sheet material 100 a plurality of first shells 61, second shells 62 and hollows or cavities 63a arranged on three respective rows that are adjacent and parallel to the advancing direction F of the sheet material 100 along the apparatus and separated by lines S1, S2 that longitudinally divide the sheet material 100 into three parts 100a, 100b, 100c that are adjacent to one another.

[0075] In particular, a first separating line S1 longitudinally divides a first part 100a that is central, containing the row of the first shells 61 from a second part 100b that is adjacent and contains the row of the cavities 63a.

[0076] A second separating line S2 longitudinally divides the first part 100a from a third part 100c that is

adjacent and contains the row of the second shells 62.

[0077] The cavities 63a have concavities that are opposite those of the first shells 61 and of the second shells 62, with respect to a plane defined by said sheet material 100. In particular, the first shells 61 and the second shells 62 form respective cavities in the sheet material 100, whilst the cavities 63a form protrusions or protuberances in the sheet material 100. The cavities 63a are formed in portions of the sheet material 100 that are intended for being cut in the first blanking station 25 to form the operating portions 63 of the spatula elements 70.

[0078] In a further embodiment of the apparatus 20 that is not illustrated in the Figures, the forming means 23 does not make any hollow or cavity on the second part 100b of the sheet material 100, the operating portions 63 being in this case substantially flat. Alternatively, the forming means 23 may form on said operating portions 63 hollows or stiffening ribs.

[0079] The first line S1 and the second line S2 may be respective ideal folding lines, or incisions made on the sheet material 100 to promote the subsequent foldings thereof, as explained in detail further on in the description.

[0080] The first shells 61 juxtaposed on the second shells 62 form respective pairs of shells 61, 62 intended for forming, once superimposed and joined, a respective cavity 78 of a container 60 intended for containing a product 80 and an operating portion 63 of a respective spatula element 70.

[0081] The first shells 61 may constitute the bases of the respective containers 60, whilst the second shells 62 may constitute the corresponding covers or closing elements of the containers 60.

[0082] In the first blanking station 25, located downstream of the forming station 22, first blanking means 26 obtains from the second part 100b of the sheet material 100 a plurality of operating portions 63 of respective spatula elements 70 that will be completely formed in the second blanking station 33. Each operating portion 63 is provided with a respective previously formed hollow or cavity 63a, and is connected to the second part 100b by a connecting strip 67.

[0083] The first blanking means 26 further makes first openings 64a on said first part 100a at the first folding line S1 and second openings 64b on said third part 100c at a longitudinal edge 100d of said sheet material 100.

[0084] The first openings 64a and the second openings 64b are arranged regularly spaced apart on respective rows parallel to the advancing direction F. The first openings 64a and the second openings 64b have a substantially specular shape and are arranged for being superimposed in pairs in the superimposing of the third part 100c on the first part 100a of the sheet material 100. The function of these openings 64a, 64b is explained in detail further on in the description.

[0085] Cutting means that is of known type and is not illustrated is provided for cutting the sheet material 100 along a line T that is transverse, in particular orthogonal, to the advancing direction F and which traverses at least

the second part 100a and the third part 100c, to enable said sheet material 100 to be folded along the two folding lines S1, S2. In other words, said cutting means blanks the sheet material 100 in a first portion, comprised between a remaining longitudinal edge 100e of said sheet material 100 and the first folding line S1, and in a second portion, comprising the edge 100d of the sheet material 100 and the second folding line S2.

[0086] Alternatively, this cut along the transverse line T can be performed by the blanking means 26.

[0087] The first blanking means 26, which is of known type and is not illustrated in detail, can be of the heat-formed punch, punch-die, or longitudinal and transverse cutting blades type.

[0088] In the first folding station 29, the first line S1 constitutes a respective folding line along which the sheet material 100 is folded, through the first folding means 30 so as to superimpose the second part 100b on the first part 100a and place the operating portions 63 inside the respective first shells 61. This is made possible by the fact that the cavities 63a of the operating portions 63 have concavities opposite those of the first shells 61, with respect to a plane of the sheet material 100.

[0089] After the first folding station 29 there is provided the filling station 24 in which the first shells 61 and/or the cavities 63a inserted therein are filled with product 80.

[0090] In the second folding station 35, the second line S2 constitutes a respective folding line along which the sheet material 100 is folded, through the second folding means 36 so as to superimpose the third part 100c on the second part 100b, which is already folded on the first part 100a and to place the second shells 62 on the first shells 61, thus enclosing the respective operating portions 63 of the spatula elements 70 (Figures 18A-18C).

[0091] Downstream of the second folding station 35 there is provided the welding station 31 in which the welding means 32 performs a welding, for example a peelable welding, between the portions 100a, 100b, 100c of the sheet material 100.

[0092] In particular, the welding means 32 performs a first welding between the first part 100a and the second part 100b of the sheet material 100 along a surrounding portion 65 of the shells 61, 62, and a second welding of more limited extent between the third part 100c and the second part 100b and between the latter and the first part 100a in a further surrounding portion 66 of said shells 61, 62.

[0093] The surrounding portions 65, 66 that are welded have an annular shape with an almost constant width, around each pair of joined and closed first shells 61 and second shells 62.

[0094] In the second blanking station 33, through second blanking means 34, the thermoformed, filled and closed containers 60 are separated from the sheet material 100. At the same time the blanking means 34 separates from said sheet material 100 the spatula elements 70, making respective gripping portions 71 therewith.

[0095] With reference to Figures 20A to 20C, the sec-

ond blanking means 34 may be configured so as to obtain from the sheet material 100 a plurality of separate and distinct containers 60.

[0096] Alternatively, the blanking means 34 can be shaped so as to separate from the sheet material 100 a row of containers 60 that are joined together by connecting strips 104 at the surrounding portions 65, as illustrated in Figures 21A, 21B, 21C.

[0097] Each container 60 thus obtained has, in addition to the surrounding portions 65, 66, that are welded, a pair of tabs or fins 68, 69 that are superimposed and not welded, belonging respectively to the first part 100a and to the third part 100c of the sheet material 100.

[0098] The openings 64a, 64b made respectively on said first part 100a, at said first line S1, and on said third part 100b of the sheet material 100, at the longitudinal edge 100d of said sheet material 100, form, superimposed, respective indentations contained inside the aforesaid tabs 68, 69 that enable a user to grasp and retain a gripping portion 71 of a respective spatula element 70. This spatula element 70 is separated from the first portion 100a and from the second portion 100b as the second blanking means 34 has cut and separated from said gripping portion 71 a portion of said sheet material 100, folded along the first line S1 that connected the first part 100a and the second part 100b as a hinge.

[0099] It is thus possible to obtain from the sheet material 100, that is thermoformable, and for each container 60, a spatula element 70, which is directly inserted into said container 60 during the manufacturing process. This enables the use of an inserting station to be avoided that is provided with means for removing spatula elements 70 from a magazine and depositing the spatula elements 70 in the shells of the sheet material 100.

[0100] It is further possible to make a complete and hermetic welding as the material of the spatula element 70 and the material of the shells 61, 62 come from the same sheet material 100.

[0101] The user, by retaining the gripping portion 71 of the spatula element 70 and grasping and pulling one of the tabs 68, 69, is able to open the container 60 and separate the two shells 61, 62 (Figures 26A, 26B, 26C, 27). Also in this case, the opening of the container 60 is complete, the two shells 61, 62 being completely separable and detachable from one another.

[0102] In an embodiment of the container 60' illustrated in Figures 26A, 26B, 26C the blanking means 34 is arranged for blanking the sheet material 100 by including in each container 60' a portion 75 of said sheet material 100 that is folded along the second line S2 and which connects the first part 100a and the third part 100c. This connecting portion 75 acts as a hinge between the first shell 61 and the second shell 62 that remain mutually connected in the opening of the container 60'.

[0103] Alternatively, the aforesaid connecting portion 75 can be made by non-peelable welding performed by the welding means 32.

[0104] With reference to Figure 28, there is illustrated

a further embodiment of the apparatus 200 that is suitable for making and filling with product 80 containers 160 that are obtained by thermoforming from a sheet material 100 that is thermoformable, and are provided internally with respective spatula elements 170.

[0105] This embodiment of apparatus 200 differs from the previously disclosed embodiment by the fact that it does not comprise a second folding station and includes on the other hand inserting means for inserting a further sheet material 150 to be superimposed on the sheet material 100 for making said containers 160.

[0106] This apparatus 200 comprises in sequence the following operating stations:

- a heating station 127 where heating means 128 heats the sheet material 100 to a temperature near the softening temperature;
- a forming station 122 in which the forming means 123 deforms portions of the sheet material 100 for forming shells 161 of containers 160 having a desired shape;
- a first blanking station 125 in which first blanking means 126 makes operating portions 163 of spatula elements 170 to be formed;
- a filling station 124 in which the shells 161 receive a product 80 to be packaged;
- a folding station 129 in which folding means 130 folds a part 100b' of said sheet material 100 until the part 100b' is superimposed on another part 100a';
- a joining station 131 in which a further sheet material 150 that is superimposed on said sheet material 100 is joined to said parts 100a', 100b'; and
- a second blanking station 133 where second blanking means 134 separates from the sheet material 100 and from the further sheet material 150 containers 160 that are formed, filled and closed and provided with spatula elements 170 that are formed and partially inserted into said containers 160.

[0107] The forming means 123, substantially similar to those disclosed in the preceding embodiment of the apparatus, makes on the sheet material 100 a plurality of shells 161 of said containers 160, arranged on a row parallel to the advancing direction F of the sheet material along the apparatus. A line S1' longitudinally divides the sheet material 100 into two parts 100a', 100b' that are placed side by side. A first part 100a' contains the row of the shells 161, a second part 100b' is not, on the other hand, deformed by the forming means 123, for forming in the first blanking station 125 operating portions 163 of the substantially flat spatula elements 170. Nevertheless, it is provided for the forming means 123 to be arranged for forming on said second part 100b' hollows, cavities, ribs for said operating portions 163.

[0108] In the first blanking station 125, located downstream of the forming station 122, first blanking means 126 obtains, in fact, from said second part 100b' a plurality of operating portions 163 of respective spatula el-

elements 170 that will be completely formed in the second blanking station 133. Each operating portion 163 is connected to the second part 100b' by a respective connecting strip 167.

[0109] The first blanking means 126 can also make, on said first part 100a', at the folding line, openings 164 arranged regularly spaced apart, parallel to the advancing direction F, each opening 164 being adjacent to a respective shell 161. Cutting means that is of known type and is not illustrated is provided for cutting the sheet material 100 along a line T' that is transverse, in particular orthogonal, to the advancing direction F and which traverses at least the second part 100b', from a longitudinal edge 100e' of said sheet material 100 to the folding line S1' (Figure 30A). Alternatively, this cut along the transverse line T' can be performed by the blanking means 126.

[0110] After the first blanking station 125 there is provided the filling station 124 in which the shells 161 are filled with product 80.

[0111] In the folding station 129, the sheet material 100 is folded along the folding line S1' by the folding means 130 so as to superimpose the second part 100b' on the first part 100a' and place the operating portions 163 that are flat on the respective shells 161.

[0112] Downstream of the first folding station 129 superimposing means 135 is arranged for superimposing a further sheet material 150, for example a film of coupled aluminium, on the sheet material 100 so as to close the shells 161 and cavities 178 formed thereby.

[0113] The sheet material 150 is unwound from a further reel 151 located adjacent to the apparatus 200.

[0114] Downstream of the superimposing means 135 there is provided the joining station 131 in which said sheet materials 100, 150 are joined at surrounding portions 165, 166 of said containers 160 and of said spatula elements 170.

[0115] The joining station is, in particular, a welding station 131 in which welding means 132 performs a welding, for example a peelable welding, between the portions 100a', 100b' of the sheet material 100 and the further sheet material 150.

[0116] In particular, the welding means 132 performs a first welding between the first part 100a' and the further sheet material 150 along a surrounding portion 165 of the shells 161, and a second welding of more limited extent between said further sheet material 150 and the second part 100b' and between the latter and the first part 100a', along a further surrounding portion 166 of said shells 161.

[0117] The surrounding portions 165, 166 that are welded have an annular shape of almost constant width, around each shell 161 containing a corresponding operating portion 163 inside the respective cavity 178.

[0118] In the second blanking station 133, through second blanking means 134, the thermoformed, filled and closed containers 160 are separated from the sheet material 100 and from the further sheet material 150. At the

same time the blanking means 134 separates from said sheet materials 100, 150 the spatula elements 170, making the respective gripping portions 171 thereof.

[0119] Each container 160 thus obtained has, in addition to the surrounding portion 165, 166, that is welded a closing portion 162 obtained by blanking said further sheet material 150 and a pair of tabs or fins 168, 169 that are superimposed and not welded, belonging respectively to the first part 100a' and to the closing portion 162.

[0120] The opening 164 made on the first part 100a', at the folding line S1', is contained inside the tab 168 and enables a user to grasp and retain the gripping portion 171 of the respective spatula element 170.

[0121] With reference to Figure 38, there is illustrated a further embodiment of the apparatus for making and filling with product 80 containers 260 obtained by thermoforming a first sheet material 100 that is thermoformable and provided internally with respective spatula elements 270, the latter being obtained by thermoforming and blanking a second sheet material 300 that is thermoformable. The first sheet material 100 and the second sheet material 300 are unwound respectively from a first reel 101 and from a second reel 301 and moved adjacent to one another, parallel and substantially coplanar by advancing means 219 along an advancing direction F.

[0122] This embodiment of apparatus 250 comprises in sequence the operating stations listed below:

- a heating station 227 where heating means 228 heats the first sheet material 100 and the second sheet material 300 to a temperature near the softening temperature;
- a forming station 222 in which the forming means 223 deforms portions of the first sheet material 100 for forming shells 261, 262 of containers 260 and portions of the second sheet material 300 for forming cavities 263a of spatula elements 270;
- a first blanking station 225 in which first blanking means 226 makes operating portions 263 of said spatula elements 270 to be formed;
- a first folding station 229 in which said second sheet material 300 is arranged above a first part 100a of said first sheet material 100;
- a filling station 224 in which shells 261 receive a product 80 to be packaged;
- a second folding station 235 in which second folding means 236 folds a second part 100b of said first sheet material 100 until the second part 100b is superimposed on the second sheet material 300 that is superimposed on the first part 100a;
- a joining station 231 in which said parts 100a, 100b and said second sheet material 300 are joined together; and
- a second blanking station 233 where second blanking means 234 separates from the sheet materials 100, 300 formed, filled and closed containers 260 and respective spatula elements 270 partially inserted therein.

[0123] The forming means 223, substantially similar to those disclosed in the preceding embodiment of the apparatus, makes on the first sheet material 100 a plurality of first shells 261 and second shells 262 arranged on two respective rows that are adjacent and parallel to the advancing direction F, separated by a line S that longitudinally divides the first sheet material 100 into two longitudinal parts 100a, 100b that are adjacent to one another.

[0124] The first part 100a contains the row of the first shells 261, the second part 100b contains the row of the second shells 262.

[0125] The forming means 223 also makes on the second sheet material 300 hollows or cavities 263a arranged aligned along the advancing direction F (Figures 39A, 39B).

[0126] In the first blanking station 225, located downstream of the forming station 222, first blanking means 226 obtains from the second sheet material 300 a plurality of operating portions 263 of respective spatula elements 270 that will be completely formed in the second blanking station 33. Each operating portion 263 is provided with a respective hollow or cavity 263a and is connected to the second sheet material 300 by a respective connecting strip 267 (Figure 40). Alternatively, the operating portions 263 may be substantially flat and devoid of hollows or cavities. Cutting means that is of known type and is not illustrated is provided for cutting the second sheet material 300 along a line T that is transverse, in particular orthogonal, to the advancing direction F to enable the portion that has thus been cut to rotate and be superimposed on the first sheet material 100.

[0127] In the first folding station 229 the second sheet material 300 is superimposed on the first part 100a so as to place the operating portions 263 inside the respective first shells 261 (Figure 41).

[0128] Downstream of the first folding station 229 there is provided the filling station 224 in which the first shells 261 and/or the cavities 263a inserted therein are filled with product 80.

[0129] In the folding station 235, the line S constitutes a folding line along which the first sheet material 100 is folded, through the folding means 36, so as to superimpose the second part 100b on the second sheet material 300 that is already superimposed on the first part 100a, so as to place the second shells 262 on the first shells 261, thus enclosing the respective operating portions 263 of the spatula elements 270 (Figures 42A, 42B).

[0130] Downstream of the second folding station 235, there is provided the welding station 231 in which the welding means 232 performs a welding, for example a peelable welding. In particular, it performs a first welding between the first part 100a and the second part 100b of the first sheet material 100, along a surrounding portion 265 of the shells 261, 262, and a second welding between the second part 100b and the second sheet material 300 and between the latter and the second part 100b along a further surrounding portion 266 of said shells 261, 262.

[0131] In the second blanking station 233, through sec-

ond blanking means 234, the thermoformed, filled and closed containers 260 are separated from the first sheet material 100 and the spatula elements 70 are separated from the second sheet material 300.

[0132] Each container 260 thus obtained has, in addition to the surrounding portions 265, 266, that are welded, a pair of tabs or fins 268, 269 that are superimposed and not welded, belonging respectively to the first part 100a and to the second part 100c of the first sheet material 100 and which are usable for opening the container 260.

[0133] The spatula element 270 comprises in addition to the operating portion 263 a gripping portion 271.

[0134] The use of two different sheet materials 100, 300 enables containers 260 and spatula elements 270 to be manufactured that have different features, in particular different thicknesses. A greater thickness may, in fact, be required, on the second sheet material 300 to make a spatula element 270 that is stiffer and tougher and therefore more convenient and efficient to be used by a user. At the same time, a first sheet material 100 with a reduced thickness can be used, for example, for forming more easily shells of complex shapes and/or for obtaining a lighter container, with a saving in material.

[0135] With reference to Figure 45 there is illustrated another embodiment of the apparatus previously disclosed in Figure 38 in which containers 360 are obtained by thermoforming a first sheet material 100 that is thermoformable and spatula elements 270, are obtained by thermoforming and blanking a second sheet material 300 that is thermoformable.

[0136] In this embodiment of the apparatus 350, forming means of the forming station, which is not illustrated in the figure, makes on the first sheet material 100 a plurality of shells 361 of containers 360 arranged aligned along an advancing direction F of the sheet materials 100, 300. Blanking means of a first blanking station, which is not illustrated in the figure, makes on the second sheet material 300 operating portions 363 of the spatula elements 370 being formed. These operating portions 363 are, for example, substantially flat (Figures 46A, 46B).

[0137] Downstream of the first blanking station, there is provided a filling station 324 in which the shells 361 are filled with product 80.

[0138] In a subsequent folding station 329, the second sheet material 300 is superimposed on the first sheet material 100 so as to place the operating portions 363 at the respective shells 361 (Figure 47).

[0139] Downstream of the folding station 329 superimposing means 335 is provided arranged for superimposing a third sheet material 150, for example a film of coupled aluminium, on the first sheet material 100 and on the second sheet material 300, so as to close the shells 361.

[0140] Downstream of the superimposing means 335, there is provided the joining station 131, in particular a welding station, wherein said sheet materials 100, 300, 150 is joined to the surrounding portions 365, 366 of said

containers 360 and of said spatula elements 370 (Figure 48).

[0141] In the second blanking station 333, the thermoformed, filled and closed containers 360 are separated from the first sheet material 100 and from the third sheet material 150 by second blanking means 334. At the same time, the blanking means 334 separates from the second sheet material 300 the spatula elements 370, making respective gripping portions 371.

[0142] Each container 360 thus obtained has, in addition to the surrounding portion 365, 366, that is welded a closing portion 362 obtained by blanking the third sheet material 150 and a pair of tabs or fins 368, 369 that are superimposed and not welded, belonging respectively to the shell 361 and to the closing portion 362.

Claims

1. Apparatus, comprising advancing means for advancing along an advancing direction (F) a sheet material (100) that is thermoformable through a forming station (2), in which there is provided forming means (3) arranged for deforming portions of said sheet material (100) so as to make shells (51, 52) of containers (50) joined by non-deformed parts of said sheet material (100), a filling station (4) in which said shells (51, 52) are filled with product (80), **characterised in that** between said forming station (2) and said filling station (4) there is interposed an inserting station (5) comprising inserting means (6) for inserting a spatula element (40) into a respective shell (51, 52) so that a gripping portion (40a) of said spatula element (40) protrude from an edge (100d) of said sheet material (100).
2. Apparatus according to claim 1, wherein said forming means (3) is arranged for forming a plurality of first shells (51) and a plurality of second shells (52) arranged mutually spaced apart on respective rows that are adjacent and parallel to said advancing direction (F).
3. Apparatus according to claim 2, wherein said forming means (3) is arranged for forming said first shells (51) on a first part (100a) of said sheet material (100) and said second shells (52) on a second part (100b) of said sheet material (100), said first part (100a) and said second part (100b) being divided by an intended folding line (S) that is parallel to said advancing direction (F).
4. Apparatus according to claim 2 or 3, wherein said inserting means (6) is arranged for inserting an operating portion (40b) of said spatula element (40) into a respective first shell (51) and said filling station (4) is arranged for dosing said product (80) in said operating portions (40b) and/or in said respective

first shells (51).

5. Apparatus according to claim 3 or 4, as claim 4 is appended to claim 3, comprising a folding station (9) located downstream of said filling station (4) and provided with folding means (10) for folding along said intended folding line (S) said second part (100b) so as to superimpose said second part (100b) on said first part (100a) of said sheet material (100).
6. Apparatus according to claim 5, comprising a welding station (11) located downstream of said folding station (9) for joining together said first part (100a) and said second part (100b) along a surrounding portion (55) of said containers (50) being formed, wherein said welding station (11) comprises welding means (12) arranged for welding said parts (100a, 100b) in such a way that tab means (53, 54) of said containers (50) are left free.
7. Apparatus according to claim 6, comprising a blanking station (13) located downstream of said welding station (11) and in which said shells (51, 52), which are joined and form respective containers (50), are separated from said sheet material (100), wherein said blanking station (13) comprises blanking means (14) arranged for cutting along said surrounding portions (55) of said containers (50) so as to separate these last from said sheet material (100) and make said tab means (53, 54).
8. Apparatus according to claim 3 or to any one of claims 4 to 7, as claim 4 is appended to claim 3, comprising downstream of said filling station (4) cutting means for cutting at least said second part (100b) of said sheet material (100) along a line (T) that is transverse to said advancing direction (F) and extending between a remaining edge (100e) of said sheet material (100) and said intended folding line (S).
9. Method, comprising advancing along an advancing direction (F) a sheet material (100) that is thermoformable, forming said sheet material (100) deforming portions thereof so as to make shells (51, 52) of containers (50) joined by non-deformed parts of said sheet material (100), filling said shells (51, 52) with product (80), **characterised in that** before said filling there is provided inserting a spatula element (40) into a respective shell (51, 52) so that a gripping portion (40a) of said spatula element (40) protrude from an edge (100d) of said sheet material (100).
10. Method according to claim 9, wherein said deforming comprises making a plurality of first shells (51) and a plurality of second shells (52) arranged mutually spaced apart on respective rows that are adjacent and parallel to said advancing direction (F).

11. Method according to claim 10, wherein there is provided making said first shells (51) on a first part (100a) of said sheet material (100) and said second shells (52) on a second part (100b) of said sheet material (100), said first part (100a) and said second part (100b) being divided by an intended folding line (S) that is parallel to said advancing direction (F).
12. Method according to claim 10 or 11, wherein said inserting comprises inserting operating portions (40b) of said spatula elements (40) into respective first shells (51), and said filling comprises dosing said product (80) at least in said operating portions (40b) and/or in said first shells (51).
13. Method according to claim 11 or 12, as claim 12 is appended to claim 11, wherein after said filling folding said second part (100b) along said intended folding line (S) is provided so as to superimpose said second part (100b) on said first part (100a).
14. Method according to claim 13, wherein, after said folding, there is provided welding said first part (100a) to said second part (100b) along a surrounding portion (55) of said containers (50) being formed, wherein said welding comprises welding said portions (100a, 100b) in such a way that tab means (53, 54) of said containers (50) are left free.
15. Method according to claim 14, wherein, after said welding, there is provided blanking said shells (51, 52) that are joined and form respective containers (50) separating respective containers (50) from said sheet material (100), wherein said blanking comprises cutting along said surrounding portion (55) of said containers (50) so as to separate these last from said sheet material (100) and make said tab means (53, 54).
16. Method according to claim 11 or to any one of claims 12 to 15, as claim 12 is appended to claim 11, further comprising cutting, after said filling, said second part (100b) of said sheet material (100) along a line (T) that is transverse to said advancing direction (F) and extending between a remaining edge (100e) of said sheet material (100) and said intended folding line (S).
17. Container having wall means made by deforming sheet material (100) that is thermoformable, comprising a first shell (51) and a second shell (52), superimposed on one another and joined at a surrounding portion (55) to form a chamber (58), and a spatula element (40) inserted into said chamber (58), **characterised in that** said spatula element (40) is inserted so that a gripping portion (40a) thereof protrudes from said chamber (58).
18. Container according to claim 17, wherein said first shell (51) and said second shell (52) are welded along said surrounding portion (55).
19. Container according to claim 17 or 18, wherein said spatula element (40) comprises an operating portion (40b) opposite said gripping portion (40a) and housed in one of said shells (51, 52).
20. Container according to claim 19, wherein said operating portion (40b) has a concave shape.
21. Container according to claim 19 or 20, wherein said operating portion (40b) has a shape that is substantially complementary to that of said shell (51, 52).
22. Container according to any one of claims 17 to 21, comprising a first tab (53) fixed to said first shell (51) and a second tab (54) fixed to said second shell (52), said tabs (53, 54) being substantially superimposed and not joined.
23. Container according to claim 22, wherein said tabs (53, 54) are superimposed on said gripping portion (40a).
24. Apparatus, comprising means for advancing along an advancing direction (F) a first sheet material (100) that is thermoformable and a second sheet material (300) that is thermoformable through a forming station (222) comprising forming means (223) arranged for deforming at least portions of said first sheet material (100) so as to make shell means (261, 262; 361) of containers (260; 360), further comprising blanking means (226, 234) for blanking portions of said second sheet material (300) and making spatula means (270; 370) to be inserted into said shell means (261, 262; 362).
25. Apparatus according to claim 24, wherein said first sheet material (100) and said second sheet material (300) are arranged adjacent and substantially parallel to said advancing direction (F).
26. Apparatus according to claim 24 or 25, wherein said forming means (223) is arranged for deforming a first part (100a) of said first sheet material (100) so as to make first shell means (261; 361).
27. Apparatus according to claim 26, comprising a first blanking station (225) located downstream of said forming station (222) and provided with first blanking means (226) suitable for blanking said second sheet material (300) so as to make operating portions (263; 363) of said spatula means (270; 370), said operating portions (263; 363) being connected to said second sheet material (300) by respective connecting strips (267; 367).

28. Apparatus according to claim 27, comprising a folding station (229; 329) located downstream of said first blanking station (225) and arranged for superimposing said second sheet material (300) on said first part (100a) and inserting said operating portions (263; 363) into said first shell means (261; 361).
29. Apparatus according to claim 28, comprising upstream of said folding station (229; 329) cutting means arranged for cutting said second sheet material (300) along a line (T) that is transverse to said advancing direction (F).
30. Apparatus according to any one of claims 26 to 29, comprising a filling station (224; 324) for dosing a product (80) in said first shell means (261; 361).
31. Apparatus according to claim 30, as appended to claim 28 or 29, wherein said filling station (224; 324) is located downstream of said forming station (222) or downstream of said folding station (229; 329).
32. Apparatus according to any one of claims 27 to 31, as claim 30 is appended to any one of claims 27 to 29, wherein said forming means (223) is further arranged for deforming said second sheet material (300) so as to make respective cavity means (263a) on said operating portions (263) of said spatula means (270).
33. Apparatus according to claim 32, wherein said cavity means (263a) has a concavity opposite that of said shell means (261, 262) with respect to a plane defined by said sheet material (100).
34. Apparatus according to any one of claims 30 to 33, as claim 32 is appended to claim 30 or 31, comprising superimposing means (335) arranged downstream of said filling station (324) and of said folding station (329) for superimposing a third sheet material (150) on said first sheet material (100) and on said second sheet material (300) so as to close said first shells (261).
35. Apparatus according to claim 34, comprising a joining station (331) located downstream of said superimposing means (335) to join said sheet materials (100, 150, 300) at surrounding portions (366) of said containers (360) and of said spatula means (370).
36. Apparatus according to claim 35, wherein said joining station is a welding station (231).
37. Apparatus according to claim 36, wherein said welding station (331) comprises welding means (332) arranged for welding said surrounding portions (366) so as to leave tab means (369) of said containers (360) and a gripping portion (371) of spatula means (370) free.
38. Apparatus according to any one of claims 35 to 37, comprising a second blanking station (333) located downstream of said joining station (331) and in which said first shell means (361) and said spatula means (370) are separated by said sheet materials (100, 150, 300).
39. Apparatus according to claim 38, wherein said second blanking station (333) comprises second blanking means (334) arranged for cutting said sheet materials (100, 150, 300) along said surrounding portions (365) and along said tab means (368, 369) of said containers (360).
40. Apparatus according to any one of claims 26 to 33, wherein said forming means (223) is further arranged for deforming a second part (100b) of said first sheet material (100) for making second shell means (262), said second part (100b) being adjacent to said first part (100a) and divided from the latter by an intended folding line (S') that is parallel to said advancing direction (F).
41. Apparatus according to claim 40, as appended to claim 30 or 31, comprising a further folding station (235) located downstream of said filling station (224) and of said folding station (229) and in which said second part (100b) is folded on said first part (100a) along said intended folding line (S') so as to superimpose said second shell means (262) on respective first shell means (261).
42. Apparatus according to claim 41, comprising a joining station (231) located downstream of said further folding station (235) to join said parts (100a, 100b) and said second sheet material (300) along surrounding portions (265, 266) of said shell means (261, 262) and of said spatula means (270).
43. Apparatus according to claim 42, wherein said joining station (231) is a welding station.
44. Apparatus according to claim 43, wherein said welding station (231) comprises welding means (232) arranged for welding said surrounding portions (265, 266) so as to leave tab means (268, 269) of said containers (260) and a gripping portion (271) of said spatula means (270) free.
45. Apparatus according to any one of claims 42 to 44, comprising a second blanking station (233) located downstream of said joining station (231) and in which said shell means (261, 262) and said spatula means (270) are separated from said sheet materials (100, 300).

46. Apparatus according to claim 45, as appended to claim 44, wherein said second blanking station (233) comprises second blanking means (234) arranged for cutting said sheet materials (100, 300) along said surrounding portions (265) and along said tab means (268, 269) of said containers (60).
47. Apparatus according to any one of claims 41 to 46, comprising upstream of said further folding station (235) further cutting means arranged for cutting said first sheet material (100) along a line that is transverse to said advancing direction (F) and such as to traverse at least said second part (100b).
48. Method comprising advancing along an advancing direction (F) a first sheet material (100) that is thermoformable and a second sheet material (300), forming said first sheet material (100) deforming portions thereof so as to make shell means (261, 262; 361) of containers (260; 360), inserting into said shell means (261; 361) spatula means (270; 370), **characterised in that** before said inserting there is provided cutting portions of said second sheet material (300) for making said spatula means (270; 370).
49. Method according to claim 48, wherein said advancing comprises advancing said first sheet material (100) and said second sheet material (300) arranged adjacent and parallel.
50. Method according to claim 48 or 49, wherein said deforming comprises deforming said first sheet material (100) for making first shell means (261; 361).
51. Method according to claim 50, wherein said cutting comprises blanking said second sheet material (300) for making operating portions (263; 363) of said spatula means (270; 370), said operating portions (263; 363) being connected to said second sheet material (300) by respective connecting strips (267; 367).
52. Method according to claim 51, wherein said inserting comprises superimposing said second sheet material (300) on said first sheet material (100) so as to arrange said operating portions (263; 363) at said respective first shell means (262; 361).
53. Method according to claim 52, comprising, before said superimposing said second sheet material (300) on said first sheet material (100), cutting said second sheet material (300) along a line that is transverse to said advancing direction (F).
54. Method according to claim 52 or 53, comprising, after said forming and before said superimposing, dosing a product (80) in said first shell means (361).
55. Method according to claim 52 or 53, comprising, after said superimposing, dosing a product (80) in said first shell means (261).
56. Method according to any one of claims 51 to 55, wherein said forming comprises deforming said second sheet material (300) for making respective cavity means (263a) on said operating portions (263) of said spatula means (270).
57. Method according to claim 56, wherein said cavity means (263a) has a concavity opposite that of said shell means (261, 262) with respect to a plane defined by said sheet materials (100).
58. Method according to any one of claims 48 to 57, comprising closing said first shell means (261; 361).
59. Method according to claim 58, as appended to claim 54 or 55, wherein said closing is after said dosing, when said dosing is after said superimposing, or is after said superimposing, when said superimposing is after said dosing.
60. Method according to claim 58 or 59, wherein said closing comprises superimposing a third sheet material (150) on said first sheet material (100) and said second sheet material (300) and joining said sheet materials (100, 300, 150) at surrounding portions (365; 366) of said first shell means (361) so as to leave tab means (368, 369) of said containers (360) and a gripping portion (371) of said spatula means (370) free.
61. Method according to claim 60, wherein said joining comprises welding.
62. Method according to claim 60 or 61, comprising, after said joining, blanking said first shell means (361) and said spatula means (370) separating said first shell means (361) and said spatula means (370) from said sheet materials (100, 300, 150).
63. Method according to claim 62, wherein said blanking comprises cutting said sheet materials (100, 300, 150) along said surrounding portions (365) and along said tab means (368, 369) of said containers (360).
64. Method according to any one of claims 50 to 59, wherein said forming further comprises deforming a second part (100b) of said first sheet material (100) for making second shell means (262), said second part (100b) being adjacent to a first part (100a) in which there is formed said first shell means (261), said parts (100a, 100b) being divided by an intended folding line (S') that is parallel to said advancing direction (F).
65. Method according to claim 64, as appended to claim

- 58, wherein said closing comprises folding said second part (100b) on said first part (100a) along said intended folding line (S') so as to superimpose said second shell means (262) on respective first shell means (261).
66. Method according to claim 67, wherein said closing further comprises joining together said parts (100a, 100b) and said second sheet material (300) along surrounding portions (265, 266) of said containers (260) and of said spatula means (270) being formed.
67. Method according to claim 66, wherein said joining comprises welding.
68. Method according to claim 66 or 67, wherein said joining comprises joining said surrounding portions (255, 256) so as to leave tab means (268, 269) of said containers (260) and a gripping portion (271) of said spatula means (270) free.
69. Method according to any one of claims 66 to 68, comprising, after said joining, blanking said shell means (261, 262) and said spatula means (270) separating said shell means (261, 262) and said spatula means (270) respectively from said first sheet material (100) and from said second sheet material (300).
70. Method according to claim 69, wherein said blanking comprises cutting said first sheet material (100) and said second sheet material (300) along said surrounding portions (265) and along said tab means (268, 269) of said containers (260).
71. Method according to any one of claims 65 to 70, comprising, before said folding said second part (100b) on said first part (100a), cutting said first sheet material (100) along a further line (T') that is transverse to said advancing direction (F) and that traverses at least said second part (100b).
72. Container, having wall means made by deforming a first sheet material (100) that is thermoformable, comprising at least a shell (261; 361) closed by closing means (262; 362) so as to form a chamber (278), and a spatula element (70; 170) partially inserted into said chamber (278), **characterised in that** said spatula element (70; 170) is made by blanking a second sheet material (300) that is thermoformable.
73. Container according to claim 72, wherein said closing means comprises at least a further shell (262) superimposed on said shell (261) and made from said first sheet material (100).
74. Container according to claim 72, wherein said closing means comprises a portion (362) of a third sheet material (150).
75. Container according to any one of claims 72 to 74, wherein said closing means (262; 362) is joined to said shell (261; 361) at a surrounding portion (265; 365).
76. Container according to claim 75, wherein said spatula element (270; 370) is joined to said shell (261; 361) and to said closing means (262; 362) at a further surrounding portion (266; 366).
77. Container according to claim 76, wherein said shell (261; 361), said closing means (262; 362) and said spatula element (270; 370) are joined by welding.
78. Container according to any one of claims 72 to 77, wherein said spatula element (270; 370) comprises an operating portion (263; 363) inserted into said chamber (278) and a gripping portion (271; 371) that protrudes from said chamber (278).
79. Container according to claim 78, wherein said operating portion (363) has a substantially flat shape.
80. Container according to claim 78, wherein said operating portion (263) comprises cavity means (263a) made by deforming of said second sheet material (300).
81. Container according to claim 80, wherein said cavity means (263a) comprises a respective cavity of concave shape.
82. Container according to claim 80 or 81, wherein said operating portion (263) has a shape that is substantially complementary to that of said shell (261).
83. Container according to any one of claims 72 to 82, comprising a first tab (268; 368) fixed to said shell (261; 361) and a second tab (269; 369) fixed to said closing means (262; 362), said tabs (268, 269; 368, 369) being substantially superimposed and not joined.
84. Container according to claim 83, wherein said tabs (268, 269; 368, 369) are superimposed on said gripping portion (271; 371) of said spatula element (270; 370).

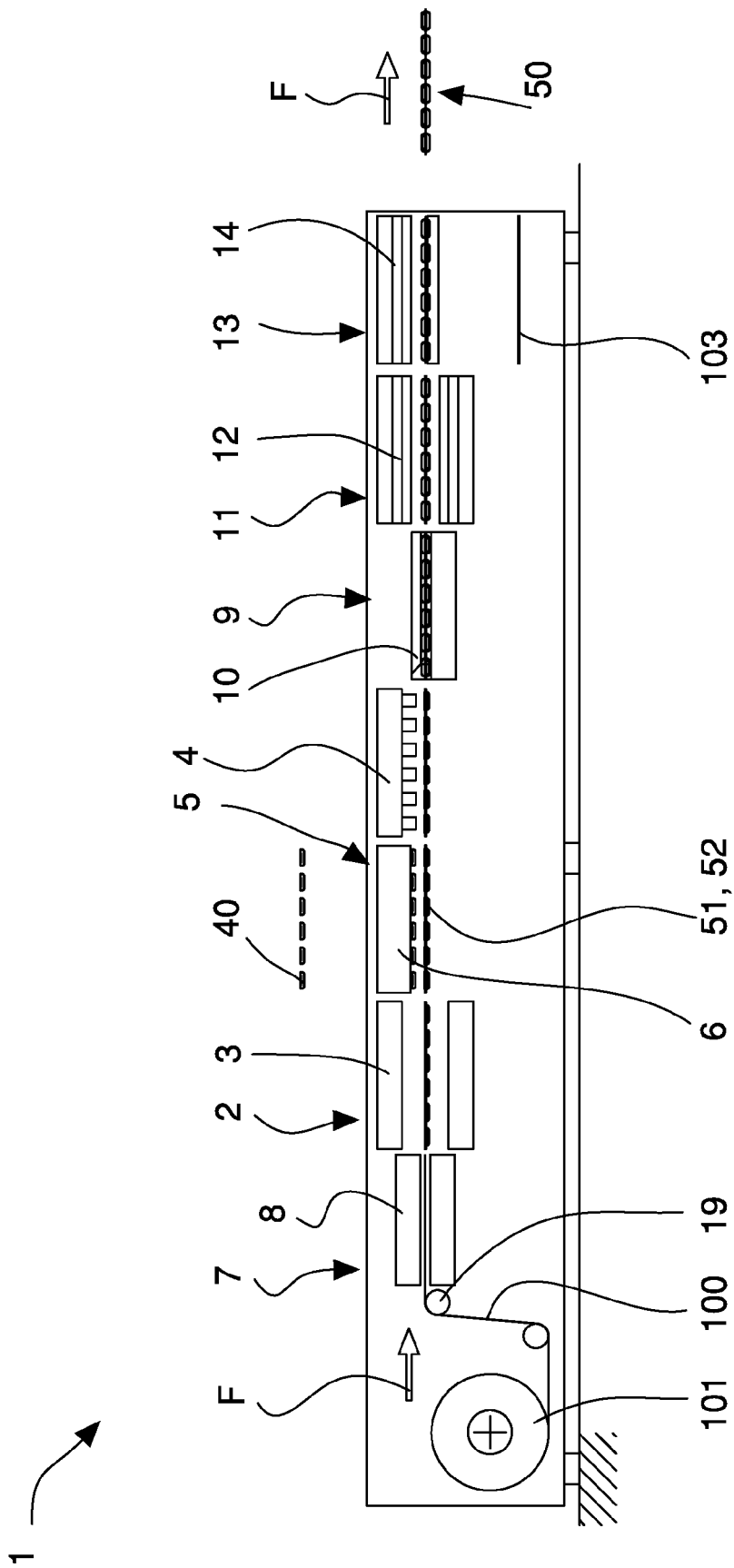


Fig. 1A

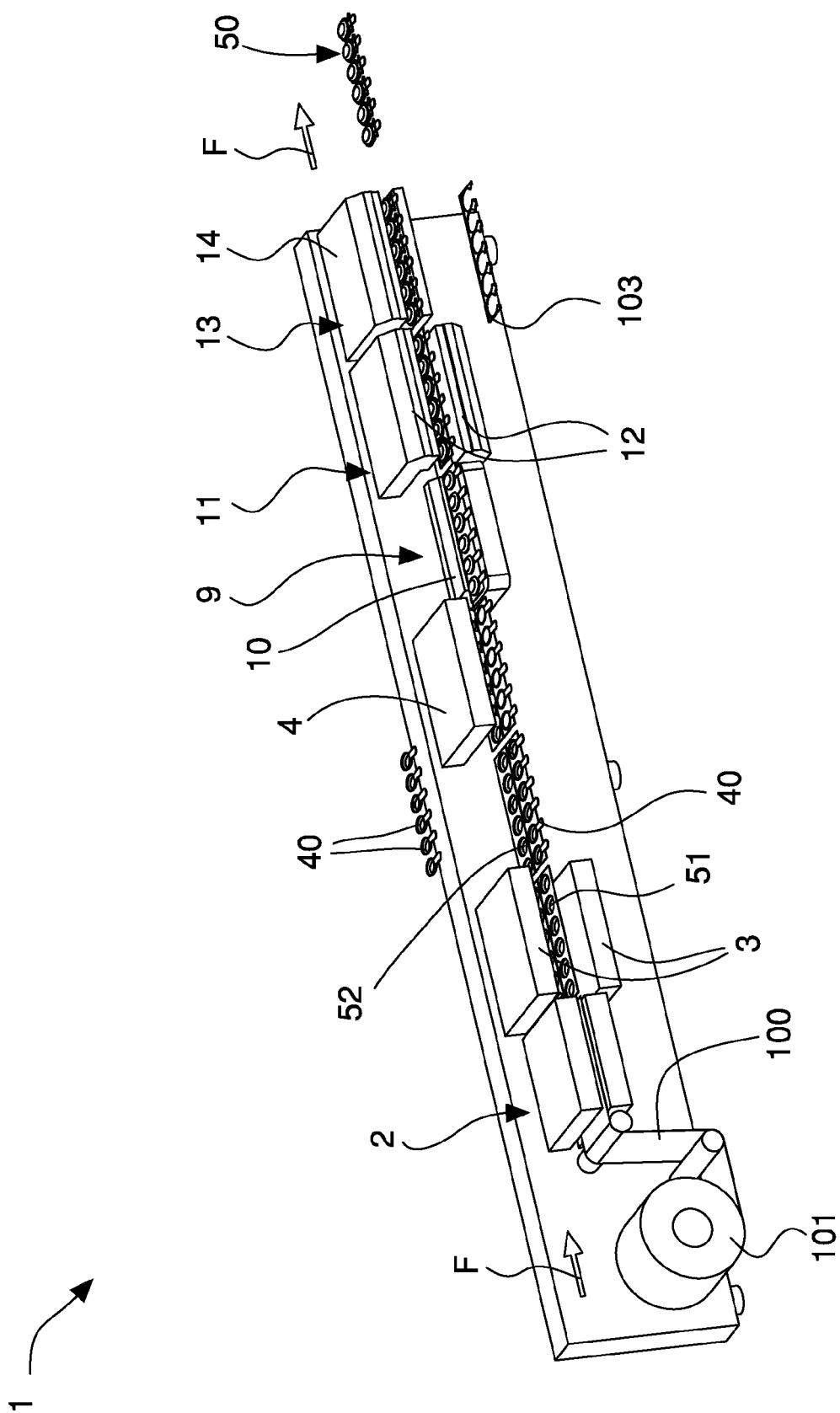


Fig. 1B

Fig. 2A

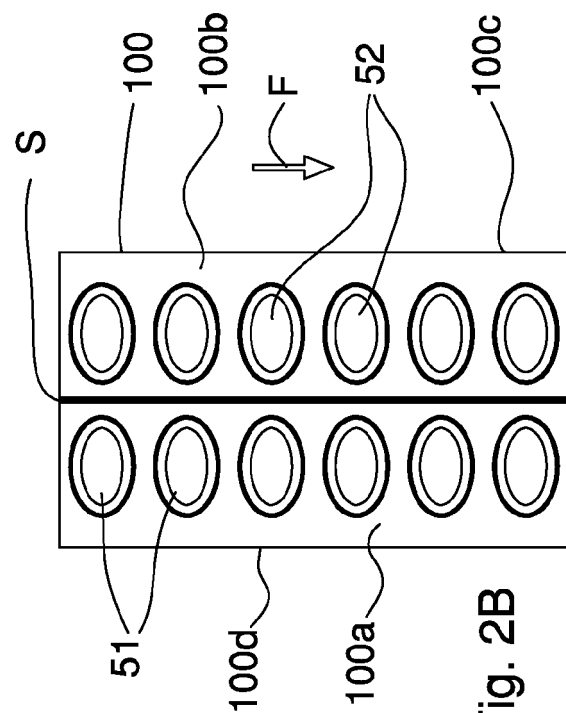
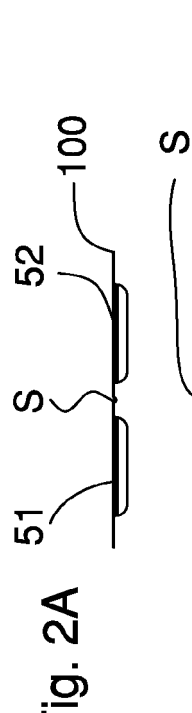


Fig. 2B

Fig. 3A

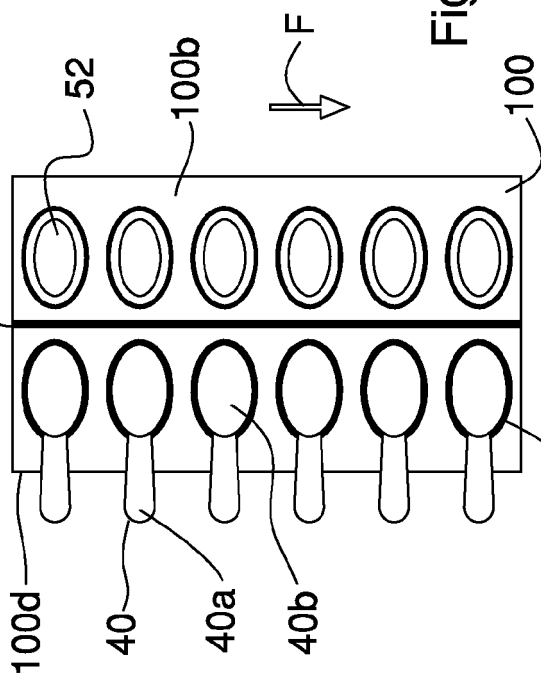
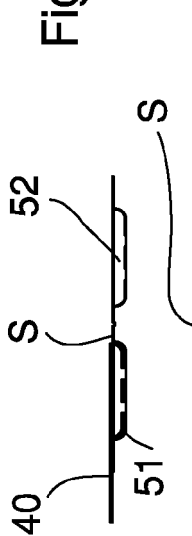


Fig. 3B

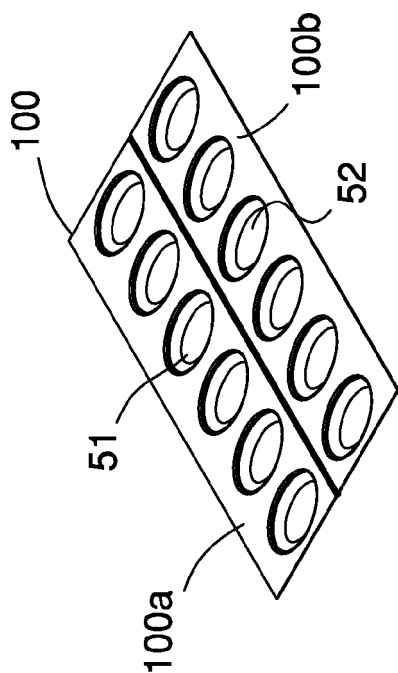


Fig. 2C

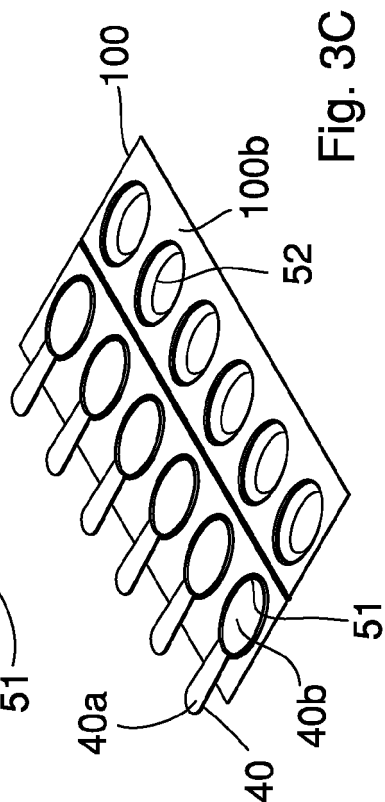


Fig. 3C

Fig. 4A

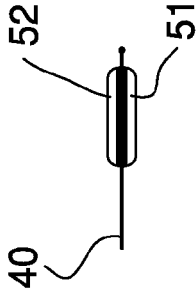


Fig. 5A

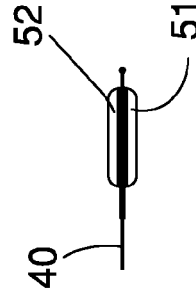


Fig. 4B

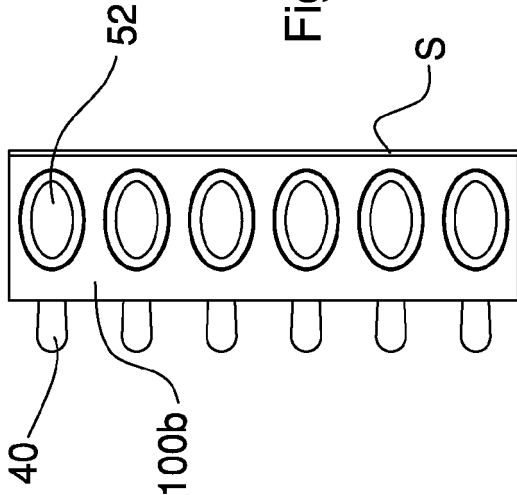


Fig. 5B

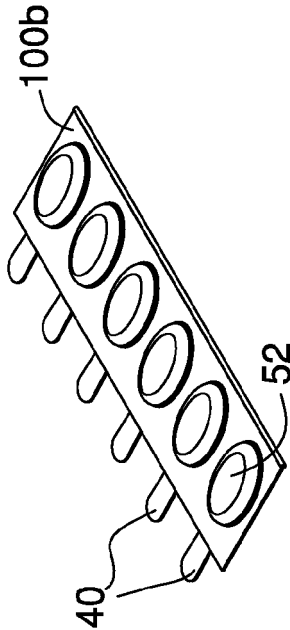
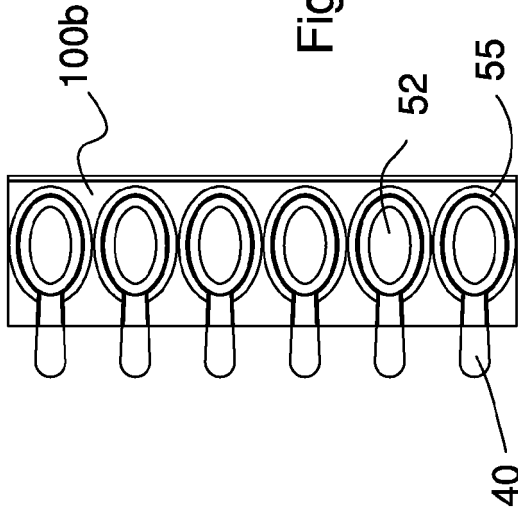


Fig. 4C

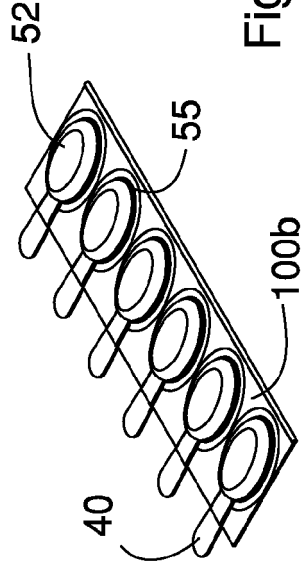


Fig. 5C

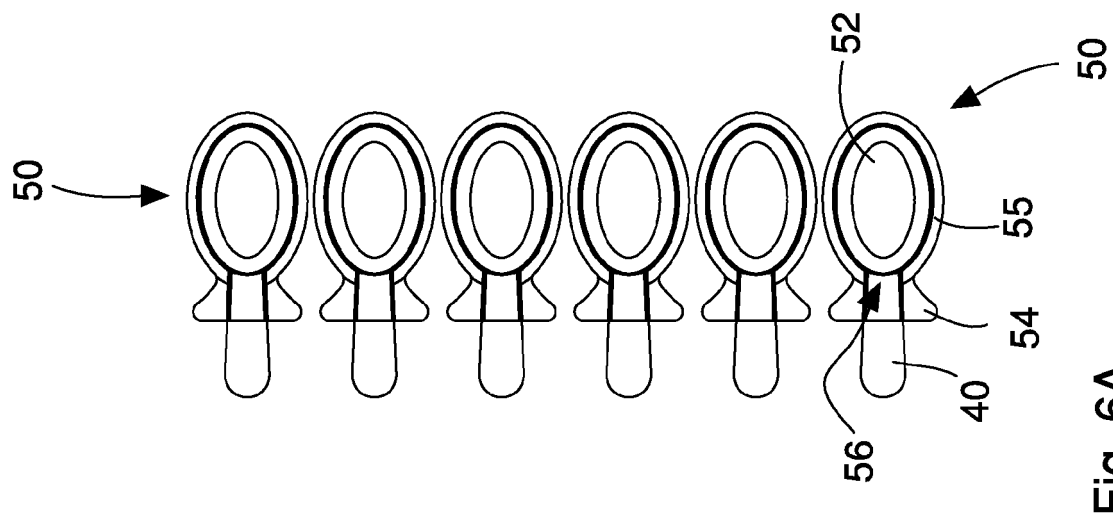


Fig. 6A

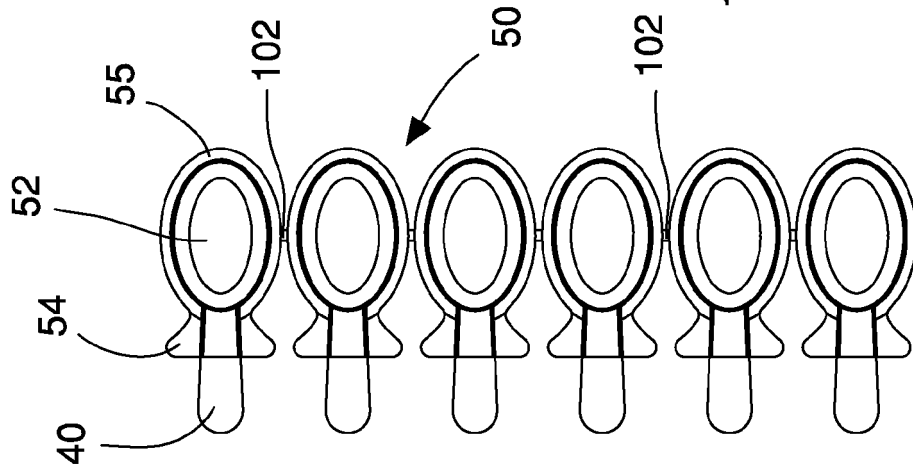


Fig. 6B

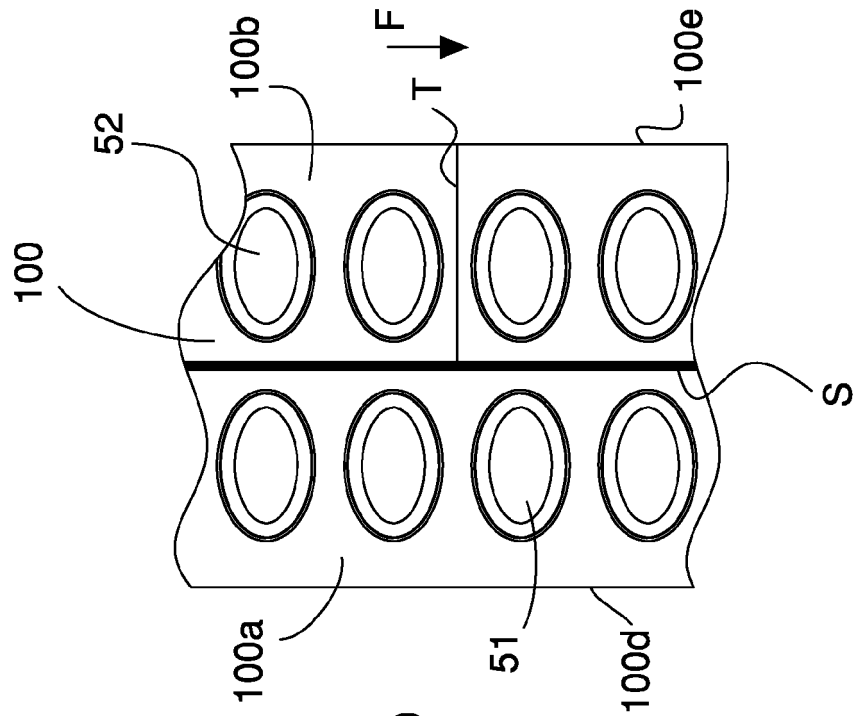


Fig. 7

Fig. 8A

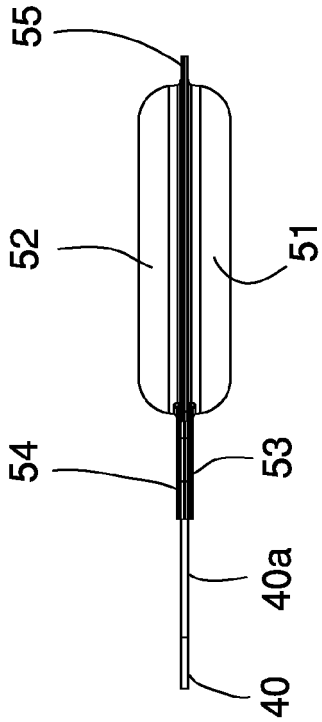


Fig. 8B

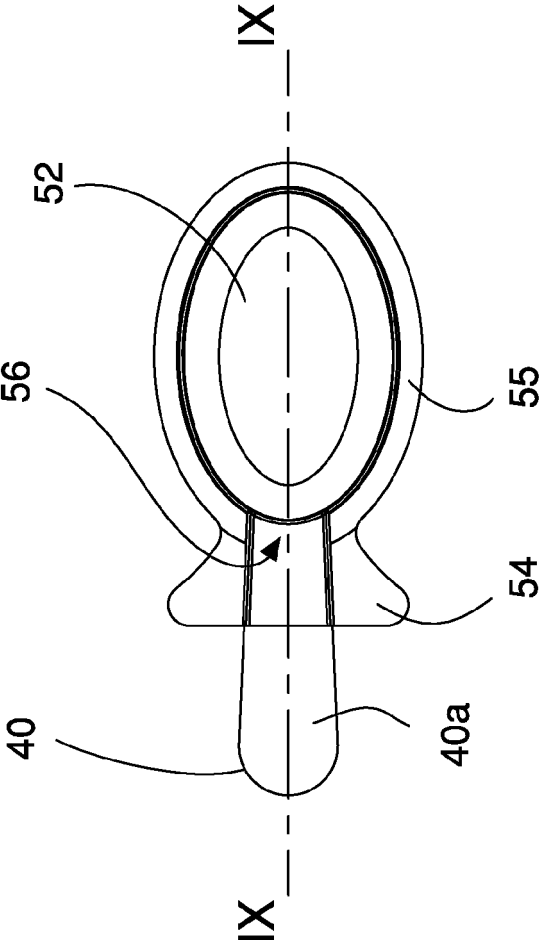


Fig. 8C

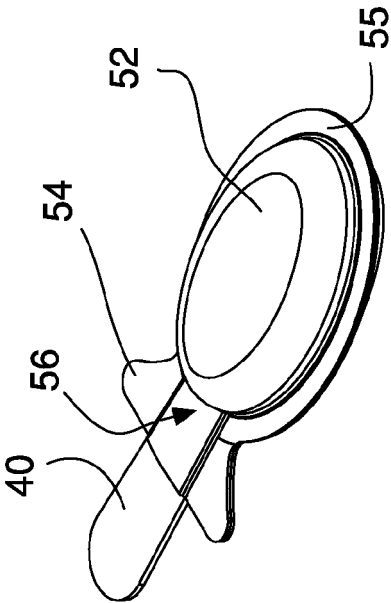
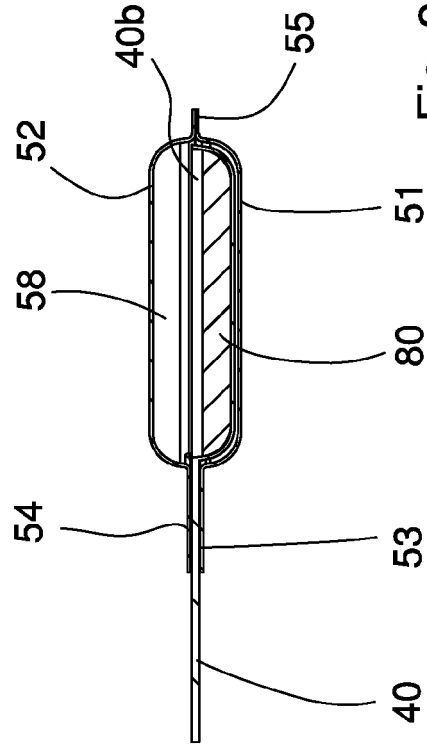


Fig. 9



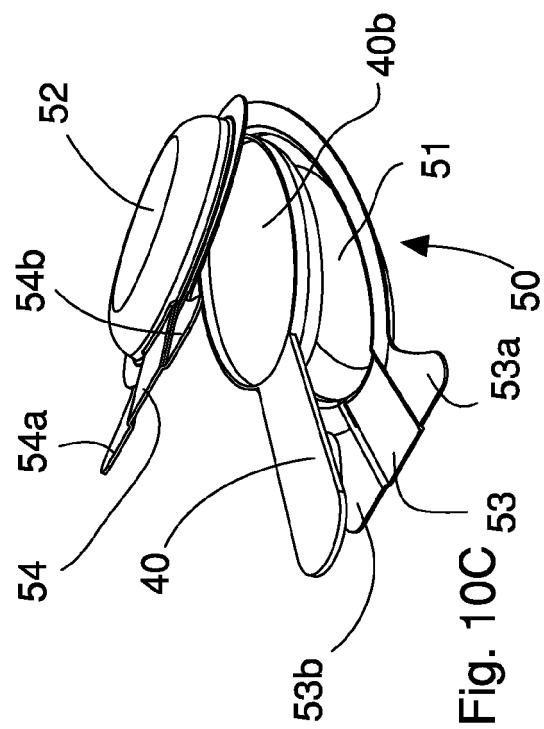
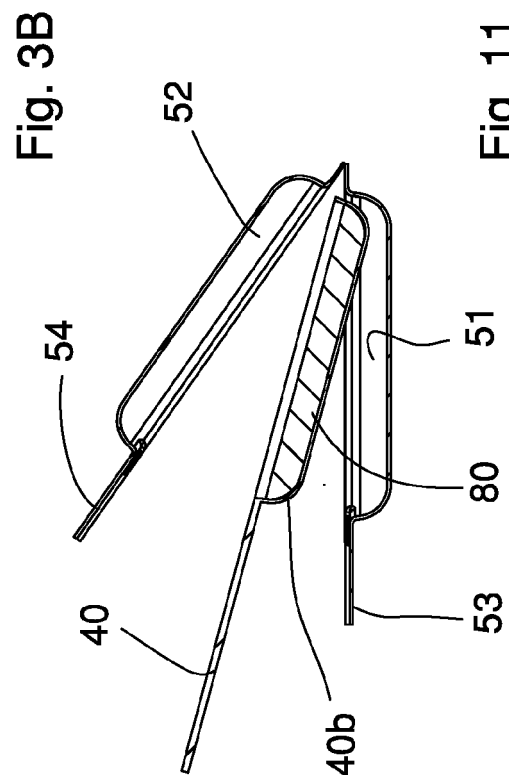
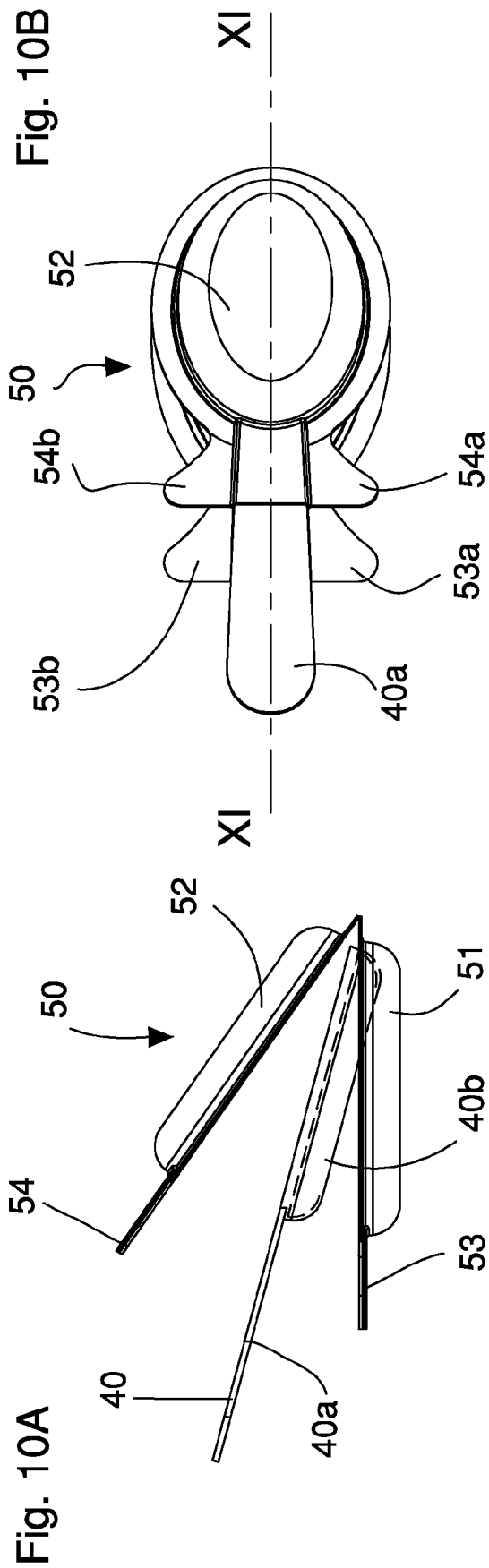


Fig. 12A

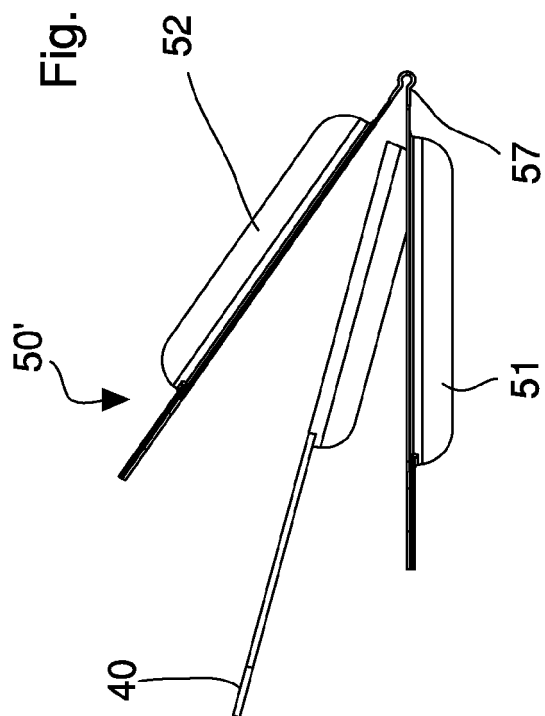


Fig. 12B

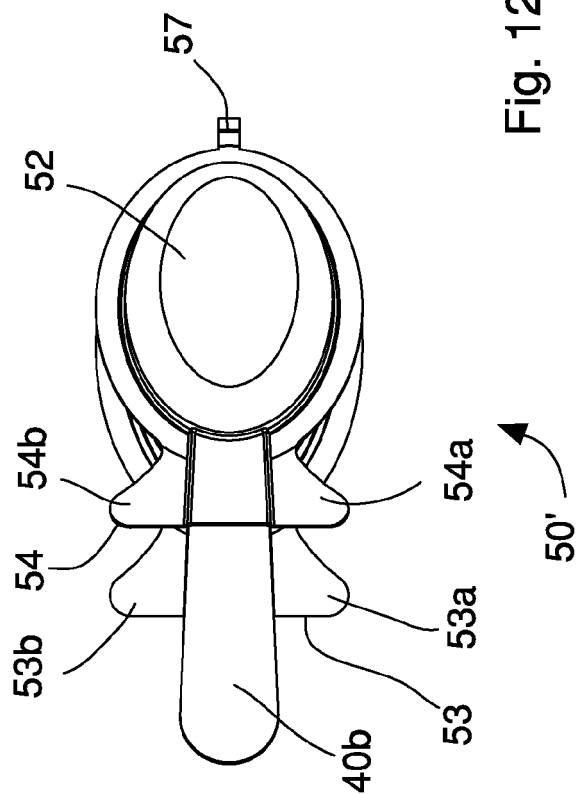
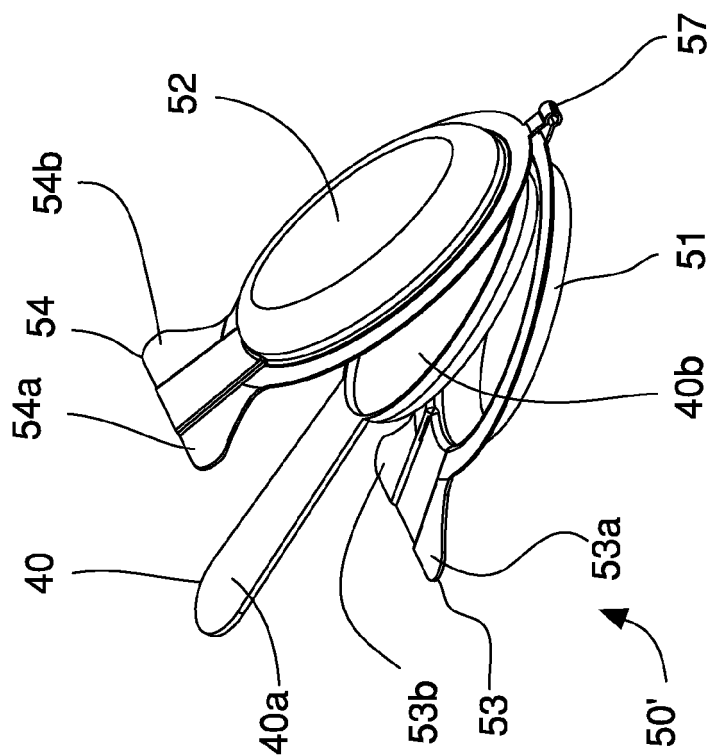


Fig. 12C



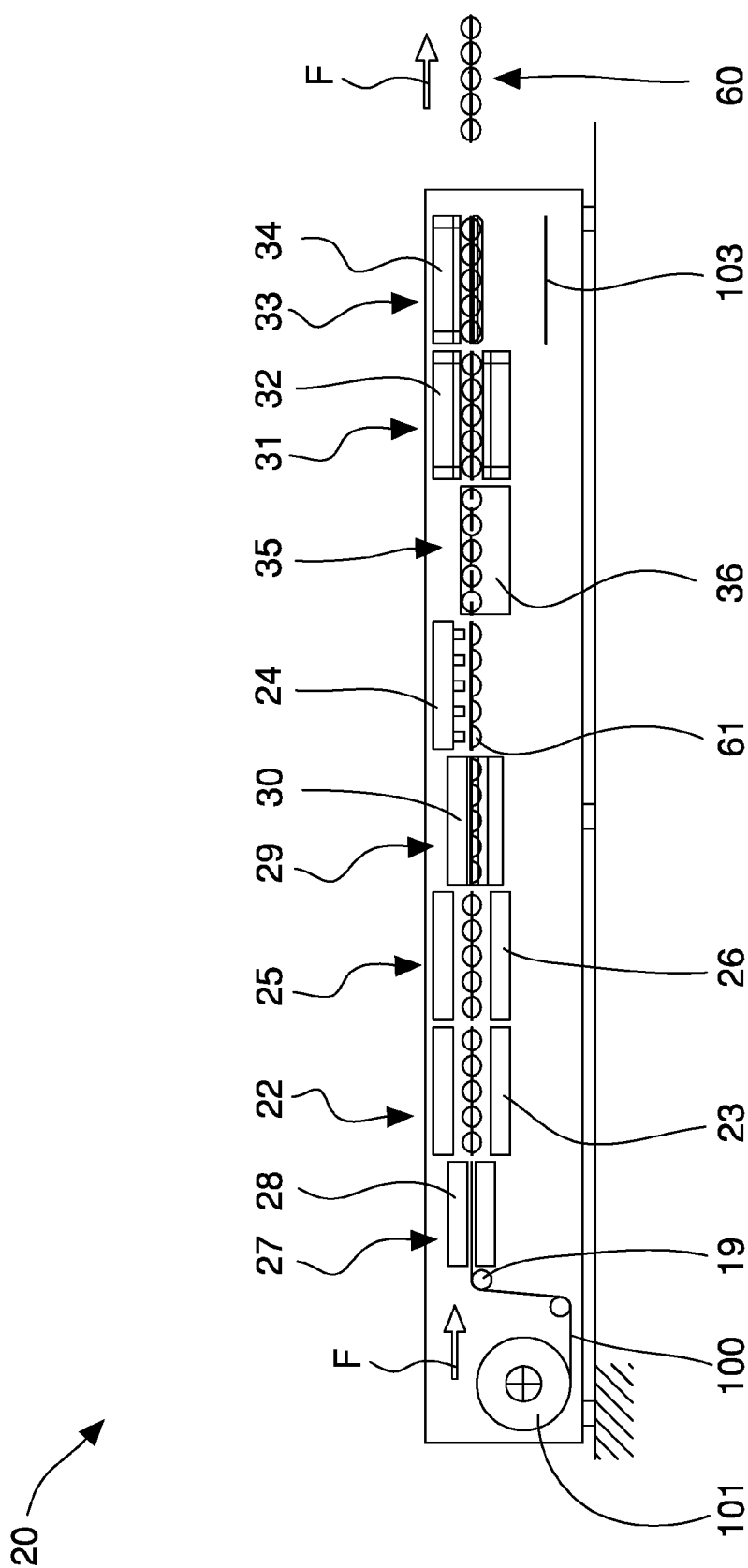


Fig. 13A

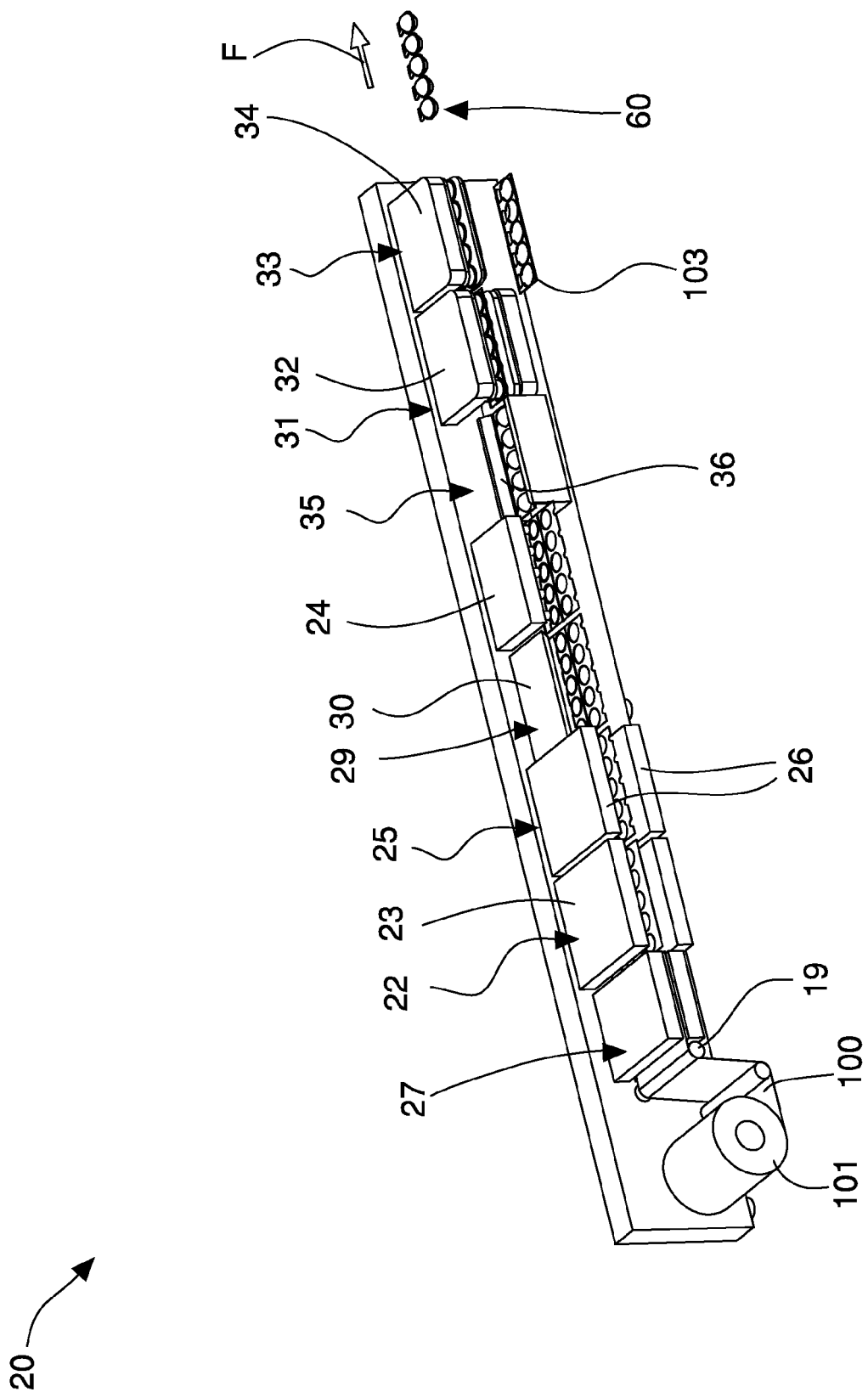


Fig. 13B

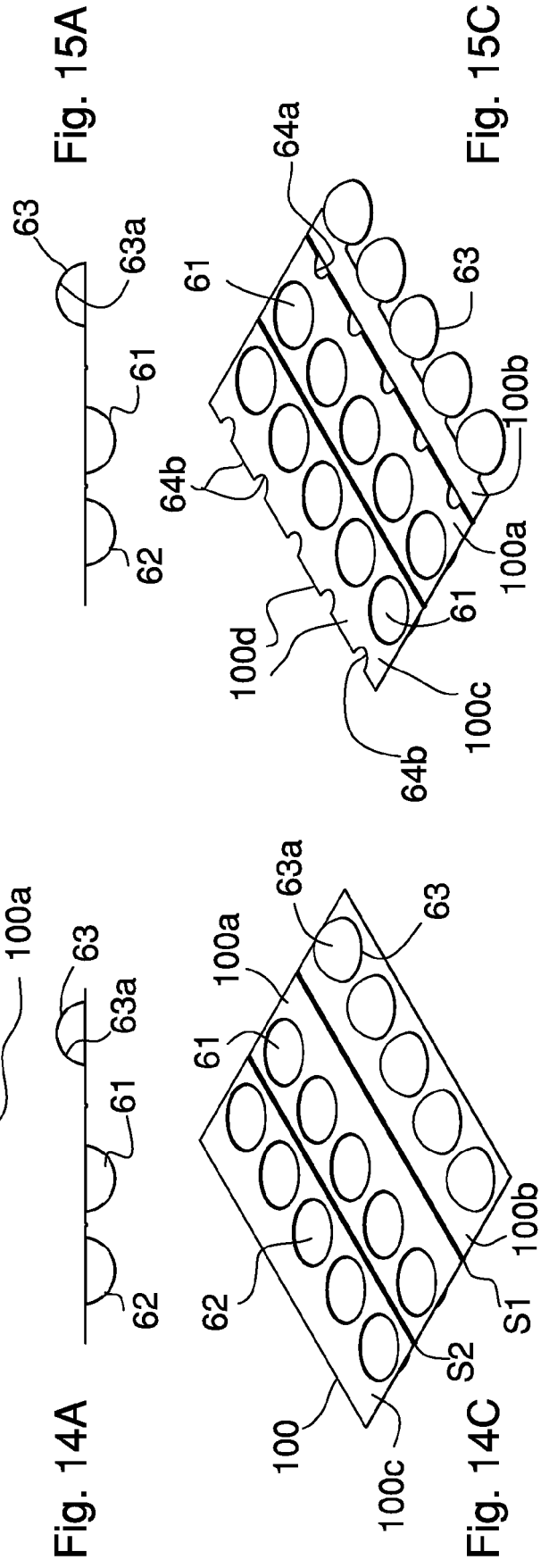
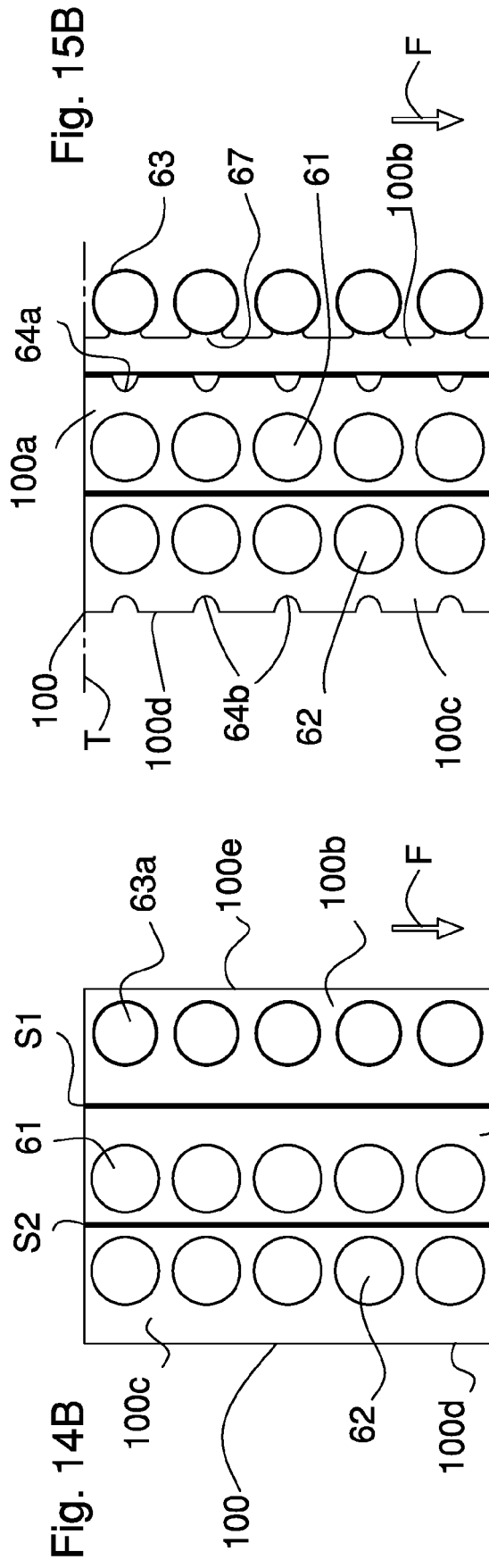


Fig. 16A

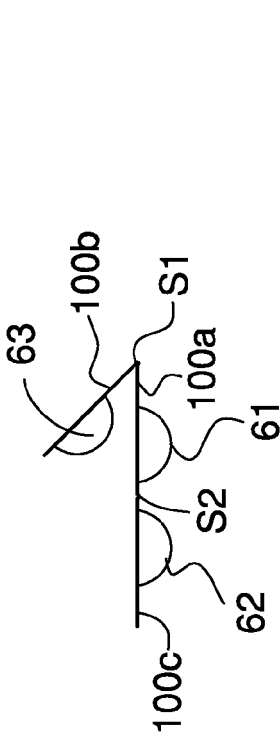


Fig. 17B

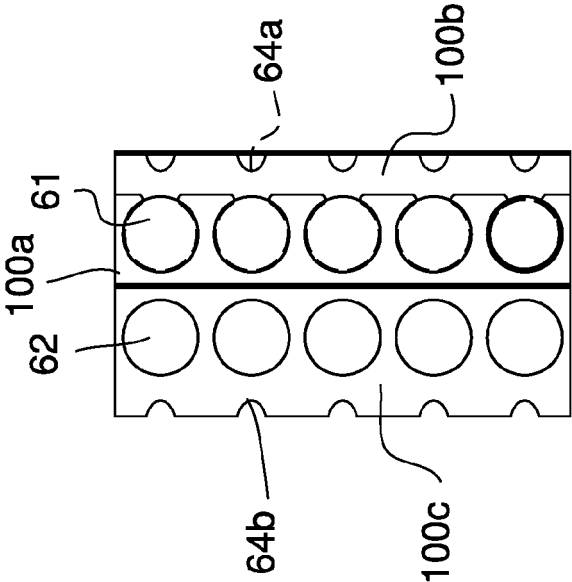


Fig. 17A

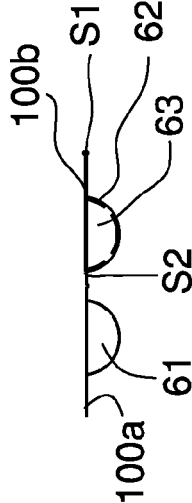


Fig. 16B

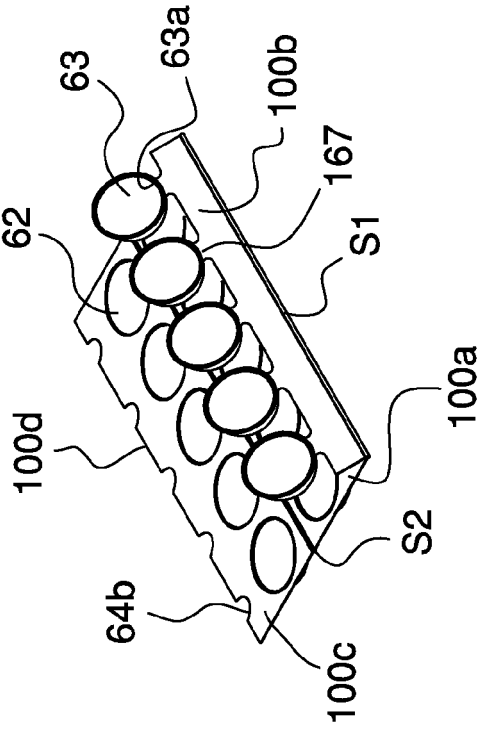


Fig. 17C

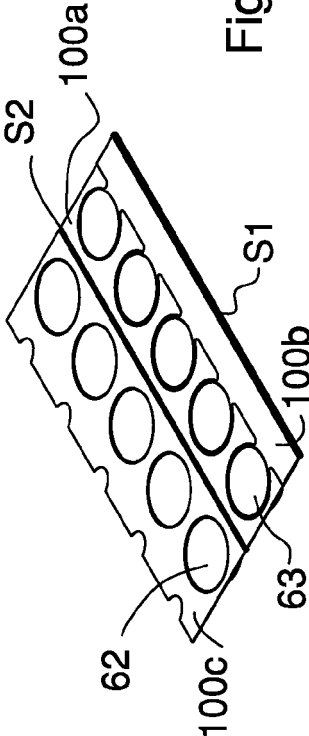


Fig. 18B

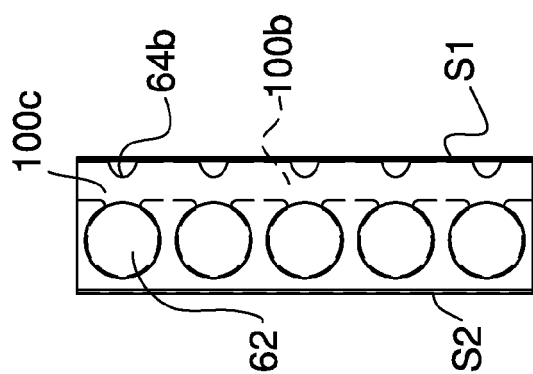


Fig. 19B

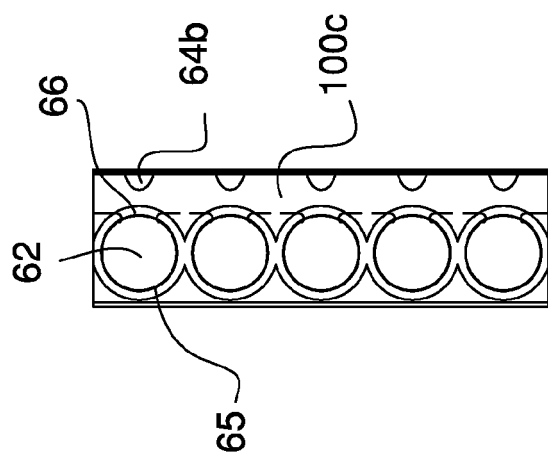


Fig. 18A

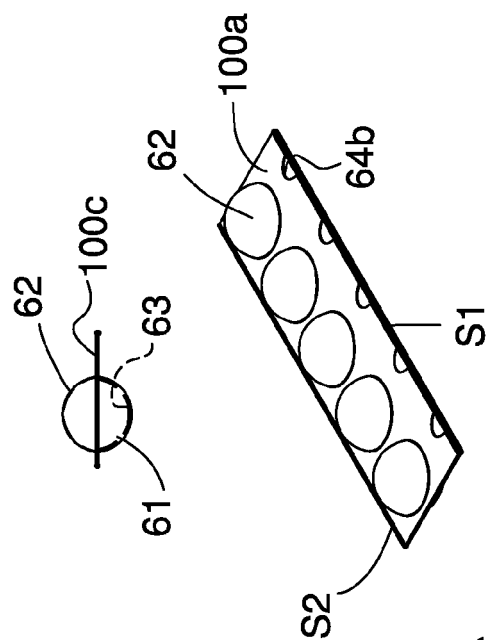


Fig. 19A

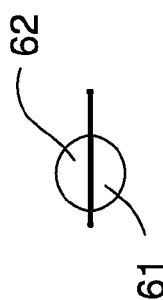


Fig. 18C

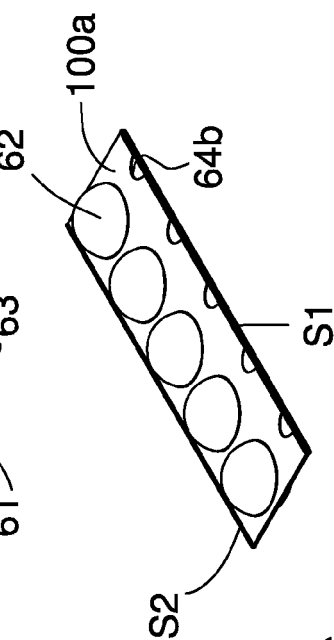
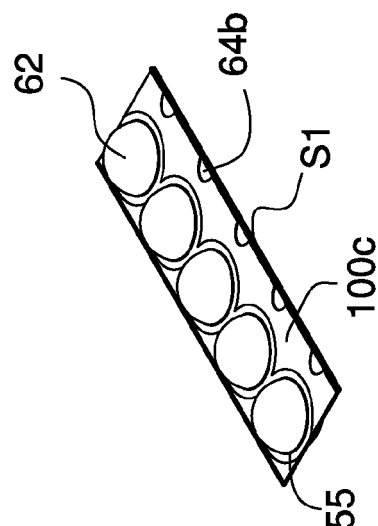


Fig. 19C



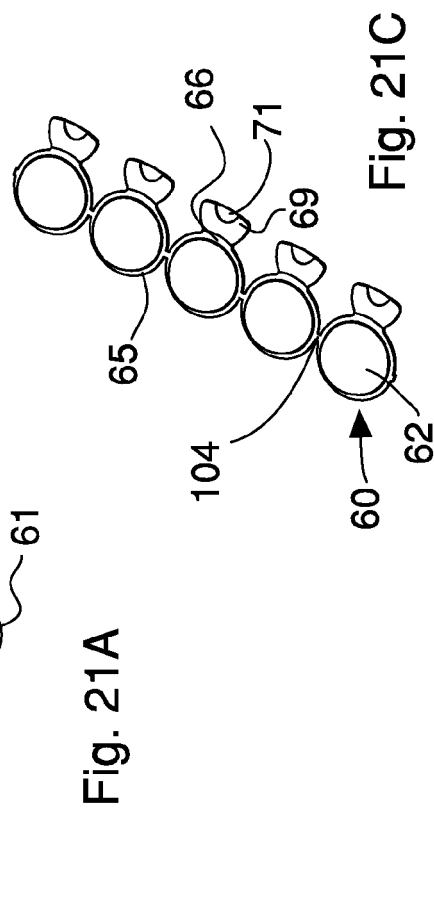
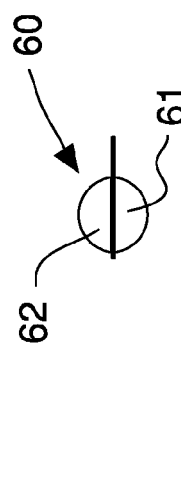
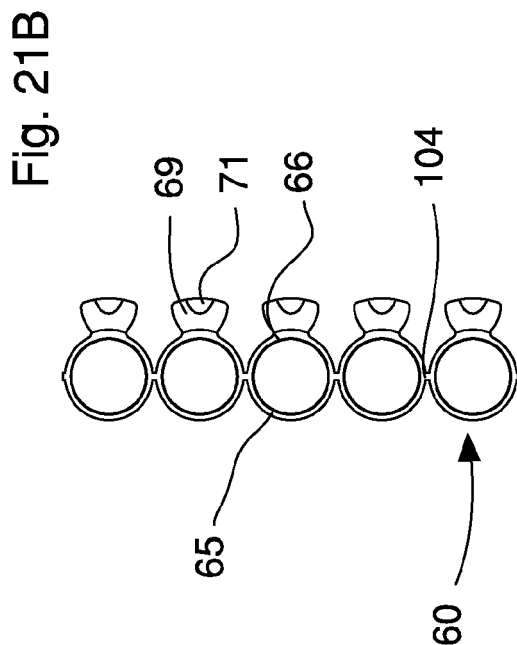
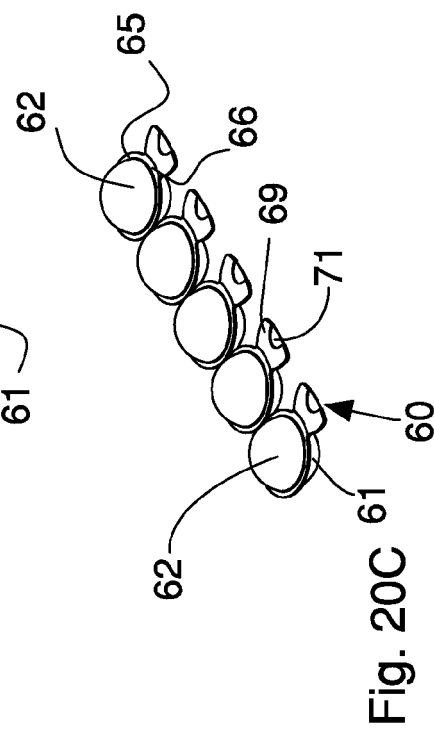
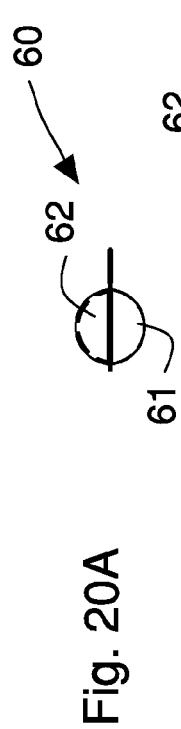
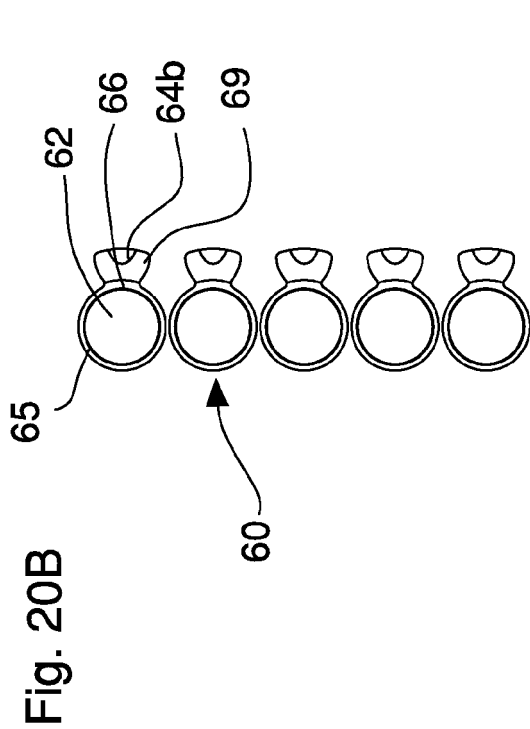


Fig. 22A

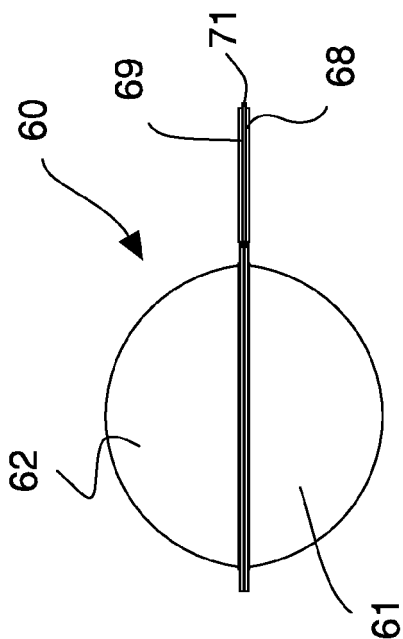


Fig. 22C

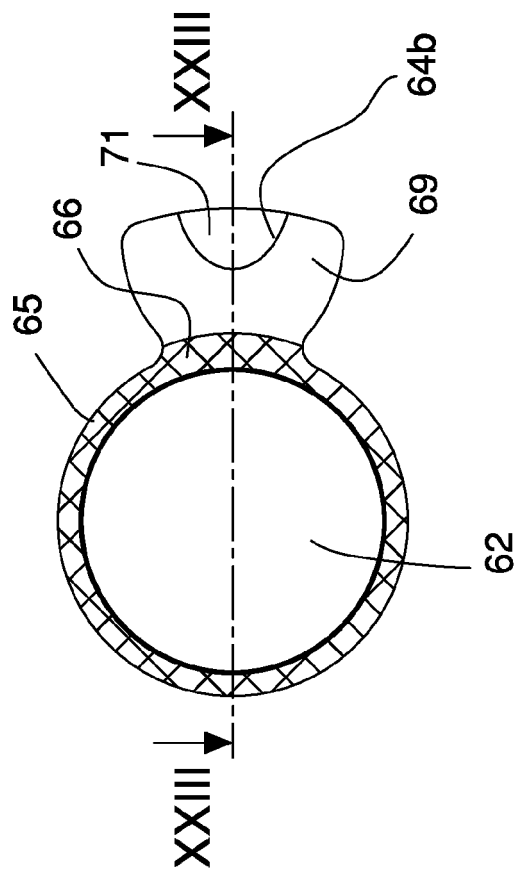
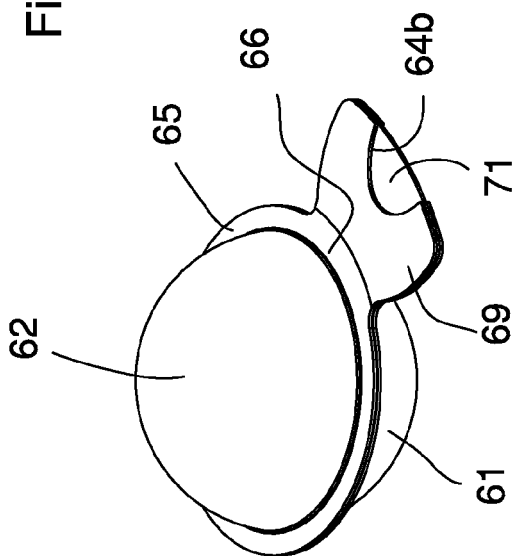


Fig. 22B

Fig. 23

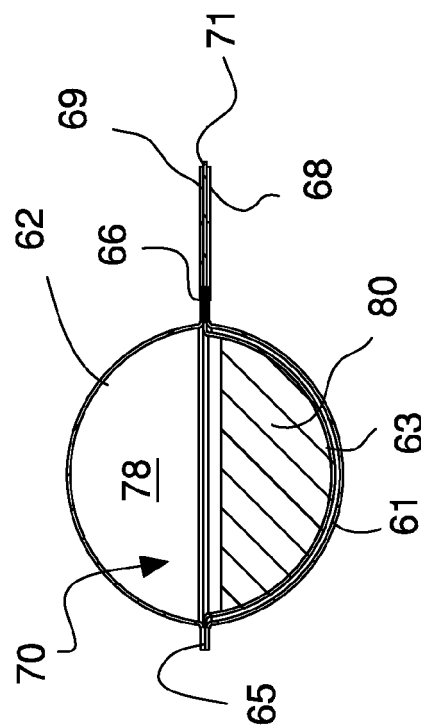


Fig. 24A

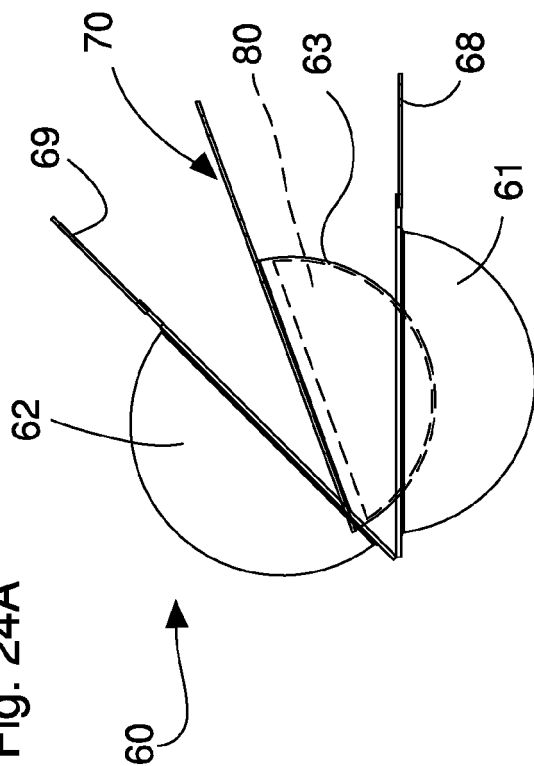


Fig. 24C

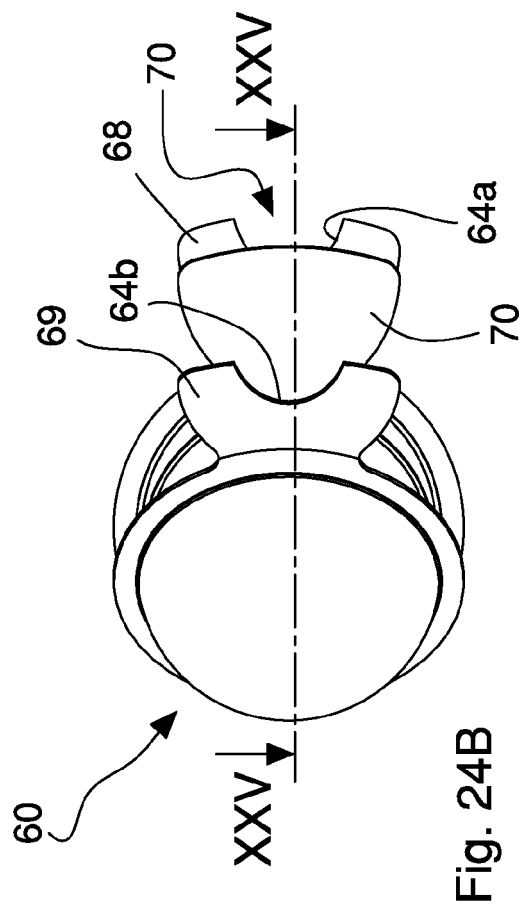
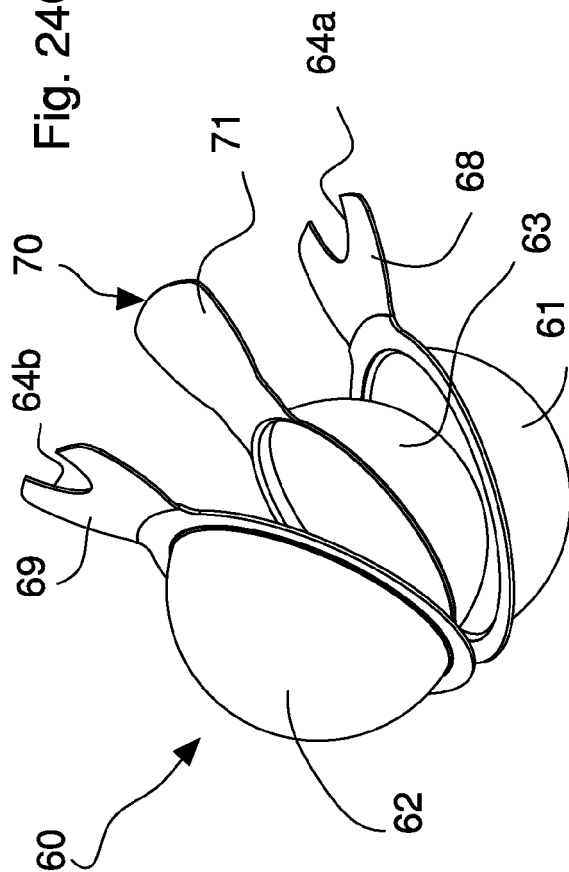


Fig. 24B

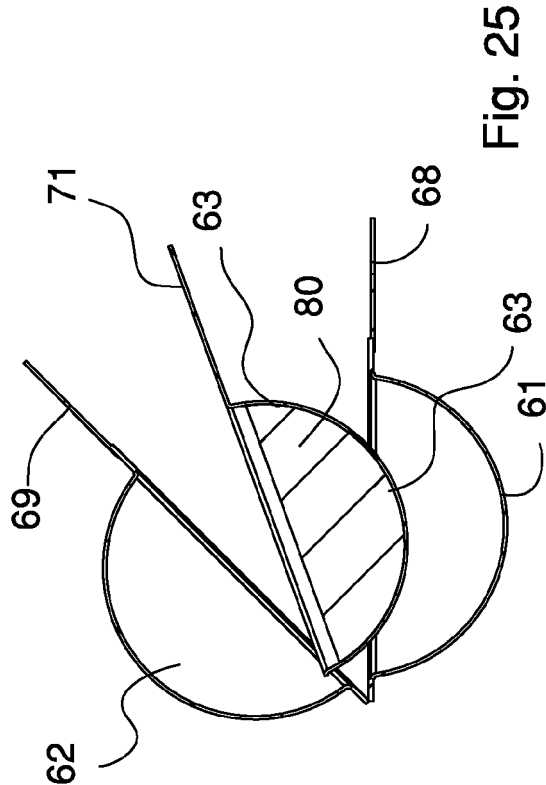
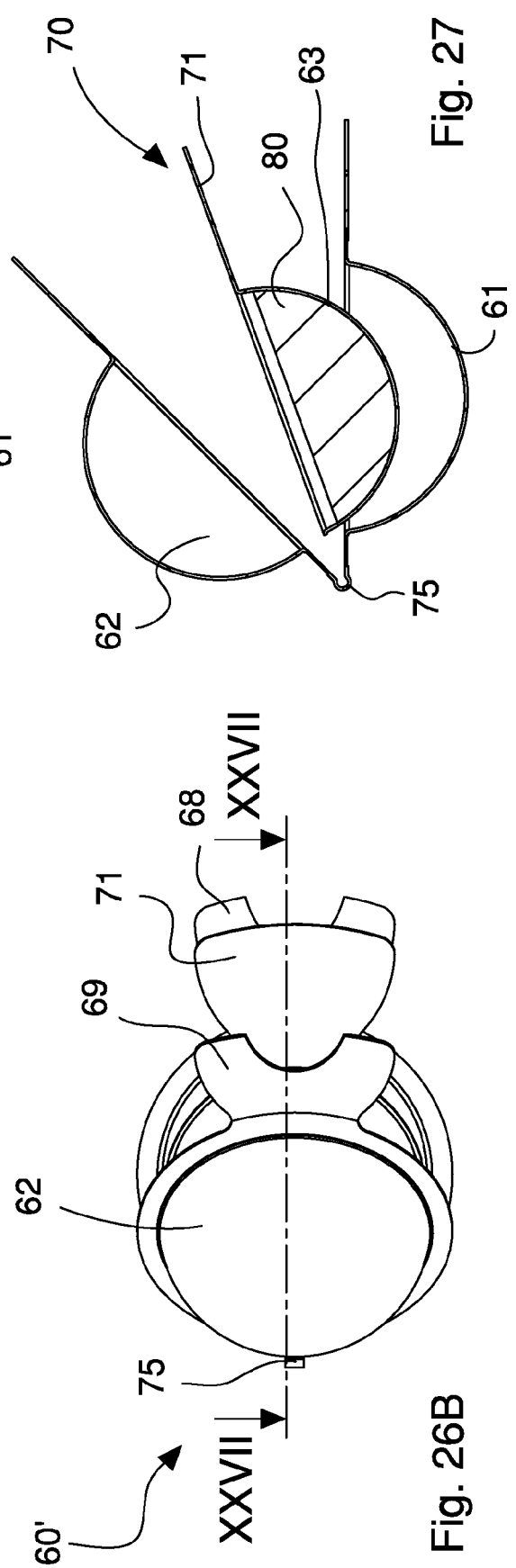
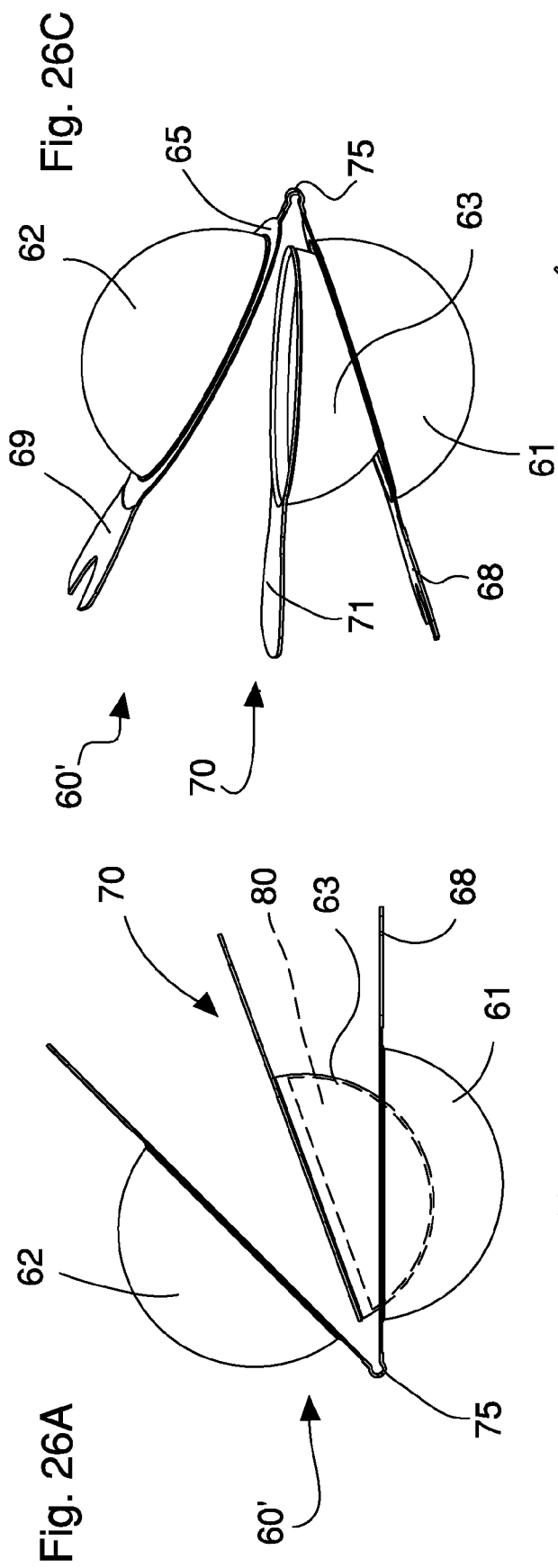


Fig. 25



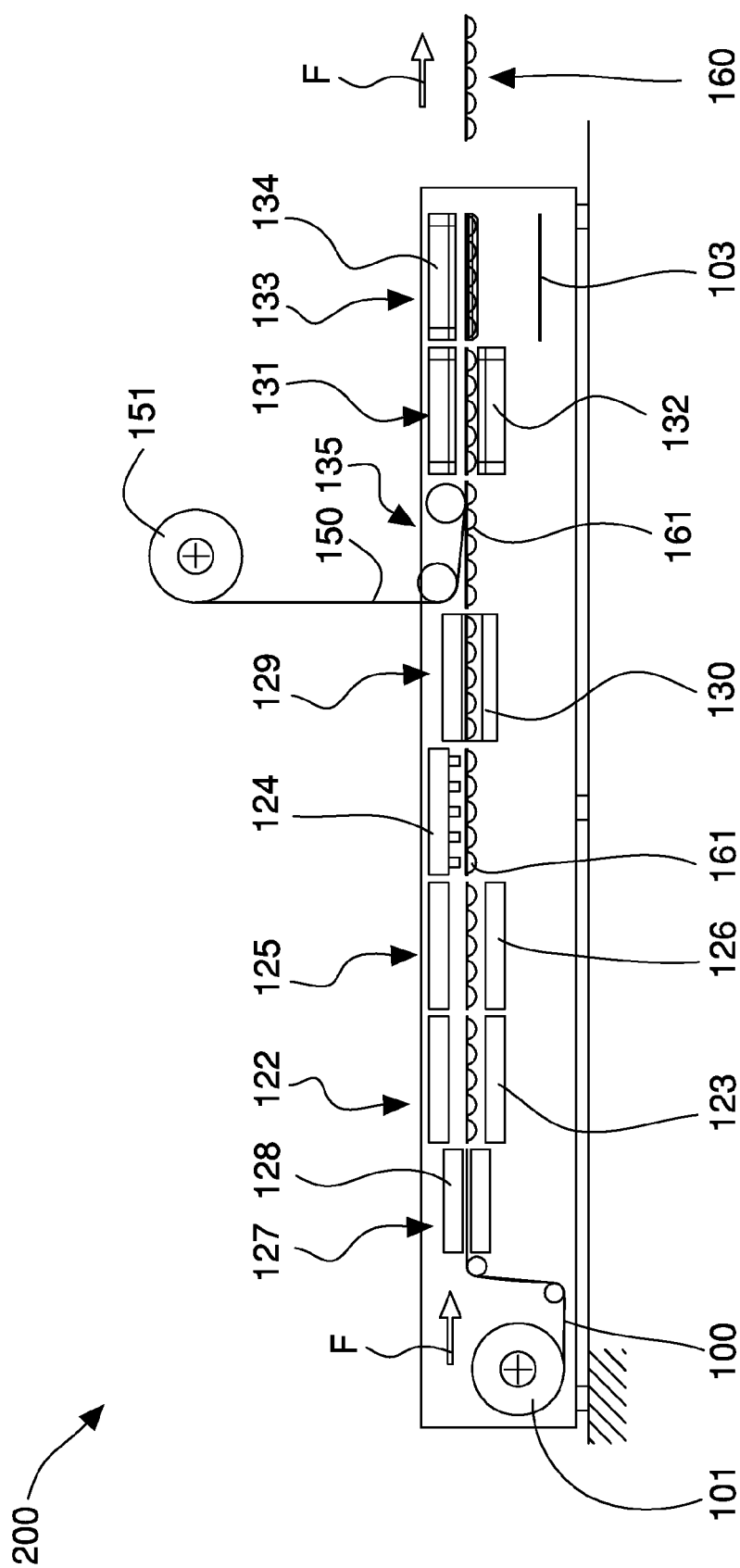


Fig. 28

Fig. 29B

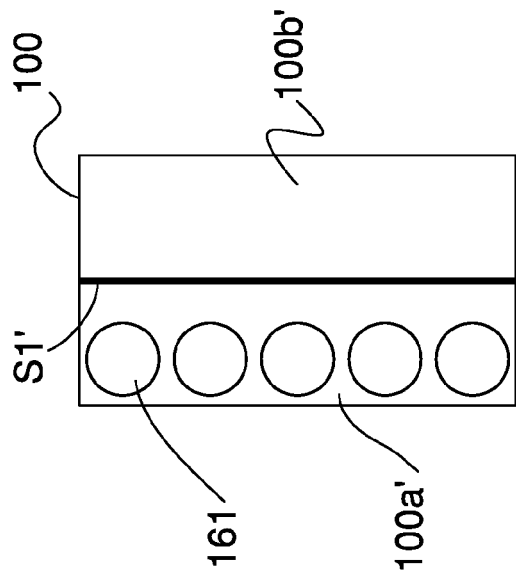


Fig. 29A

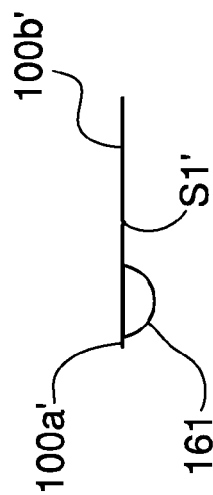


Fig. 29C

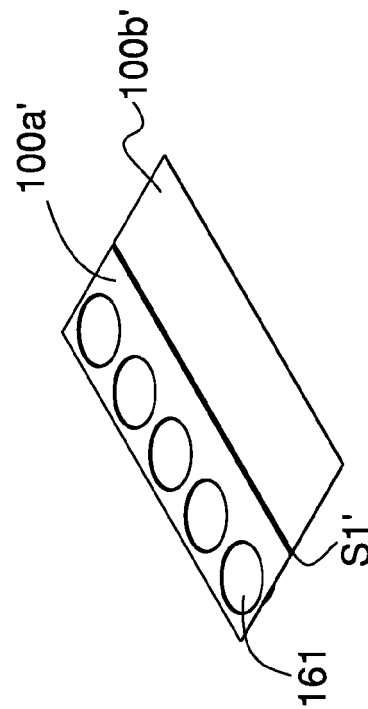


Fig. 30A

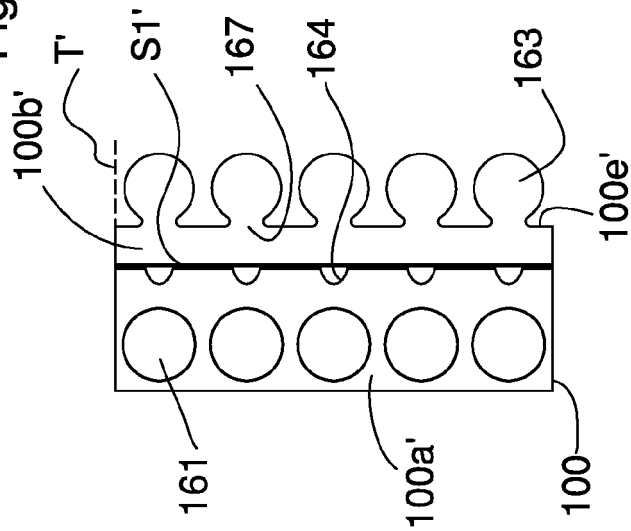


Fig. 30B

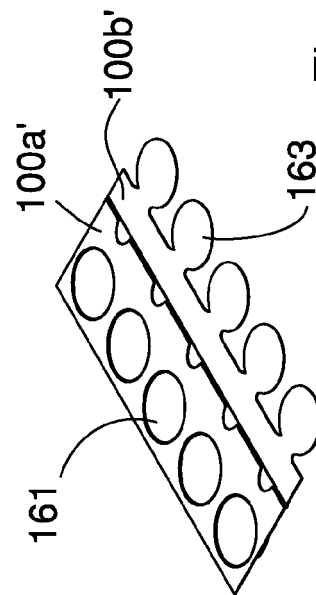


Fig. 31

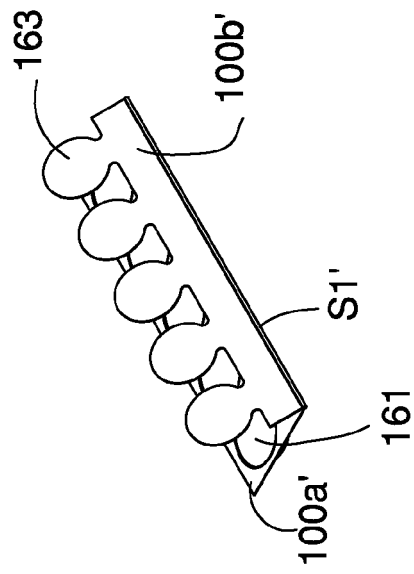


Fig. 32B

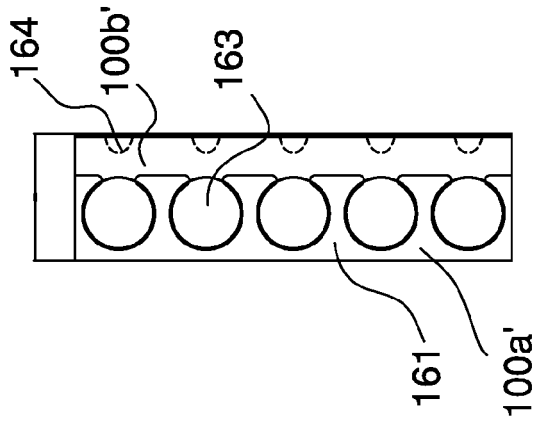


Fig. 33A

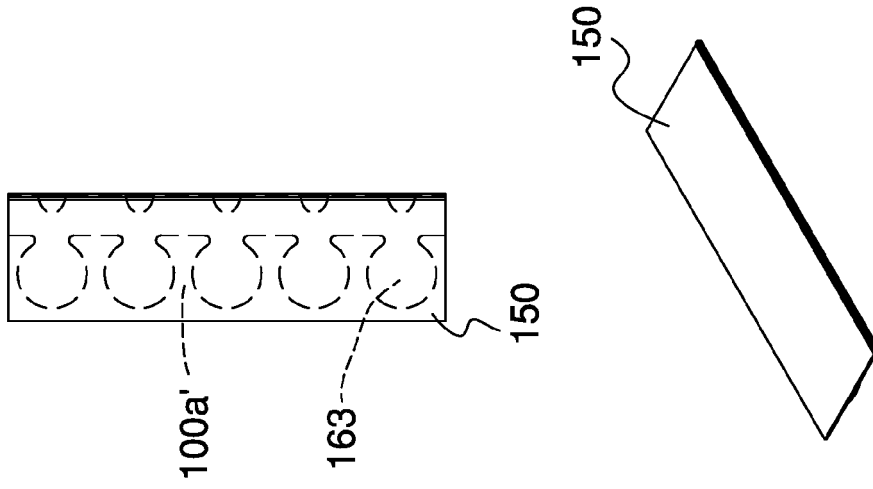


Fig. 32C

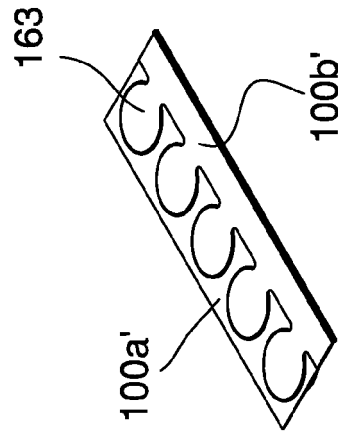


Fig. 32A

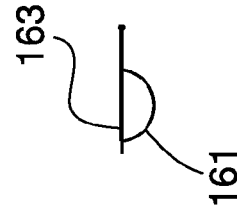


Fig. 33B

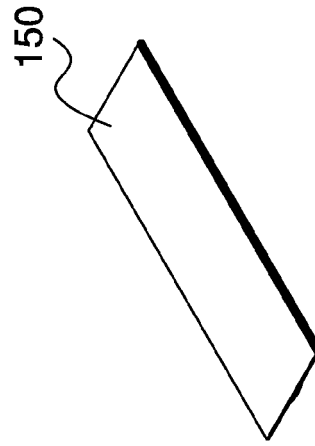


Fig. 34B

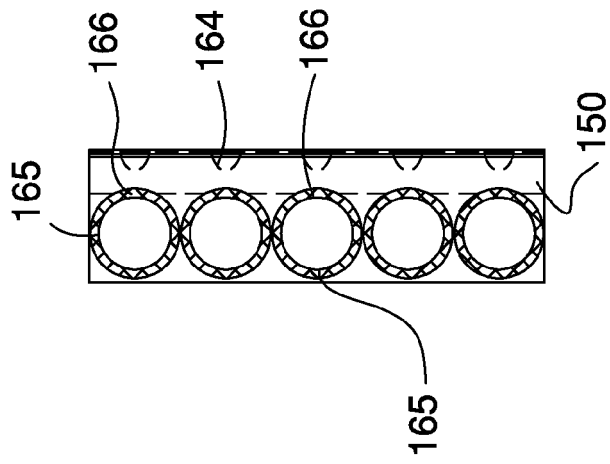


Fig. 35B

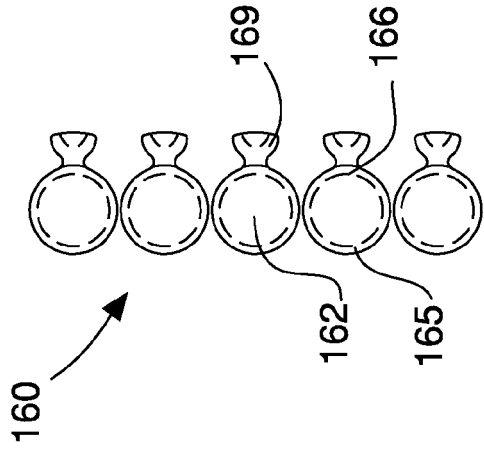


Fig. 34A

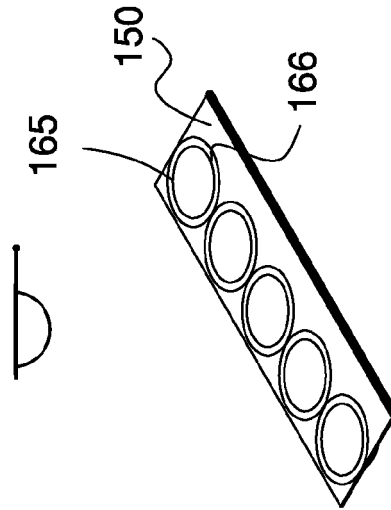


Fig. 35A

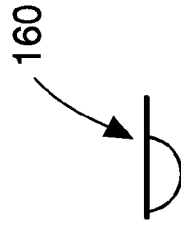


Fig. 34C

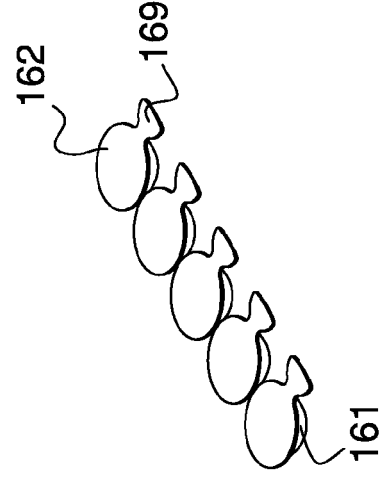
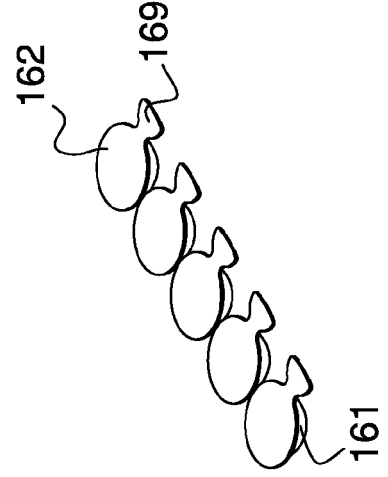


Fig. 35C



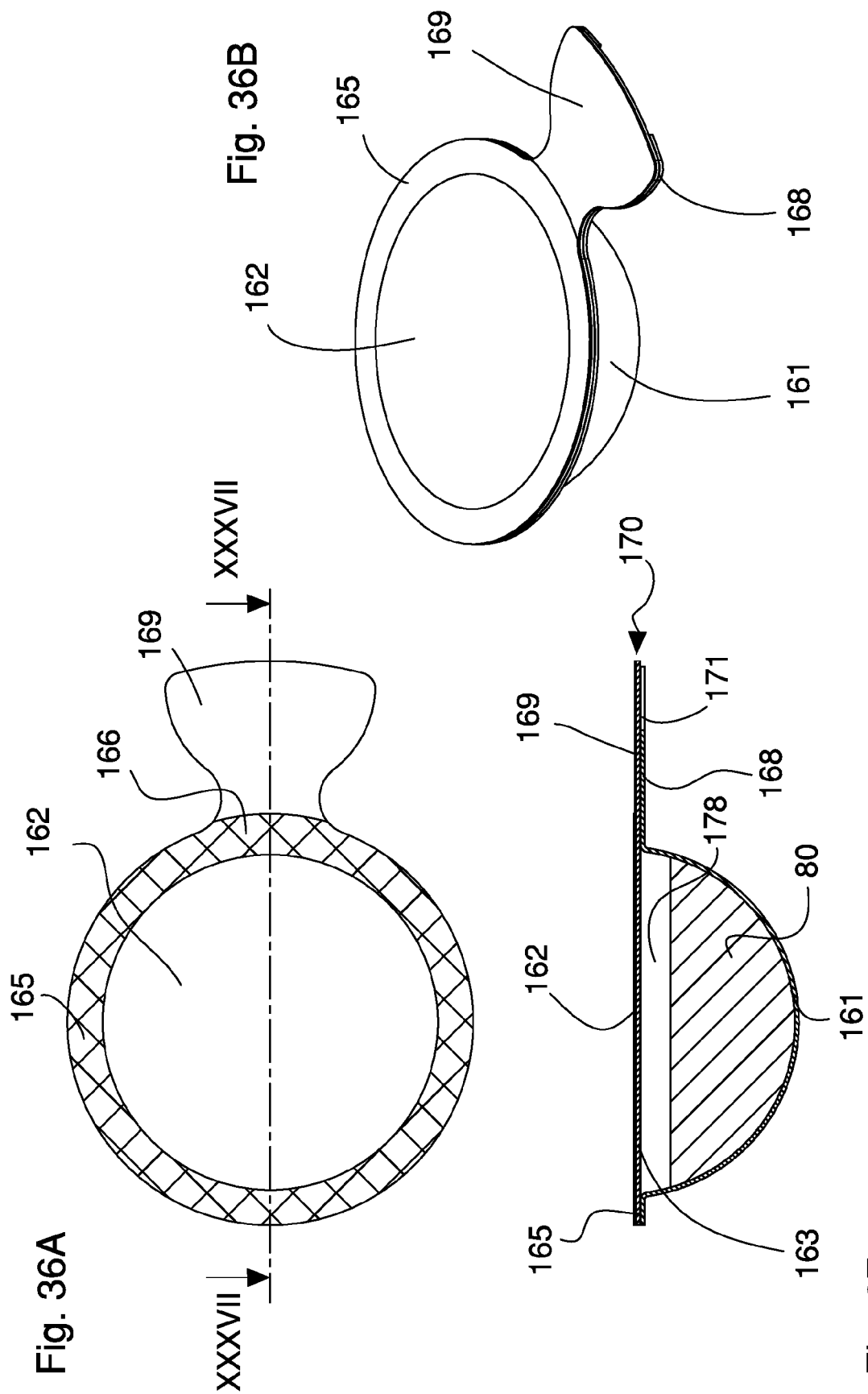


Fig. 37

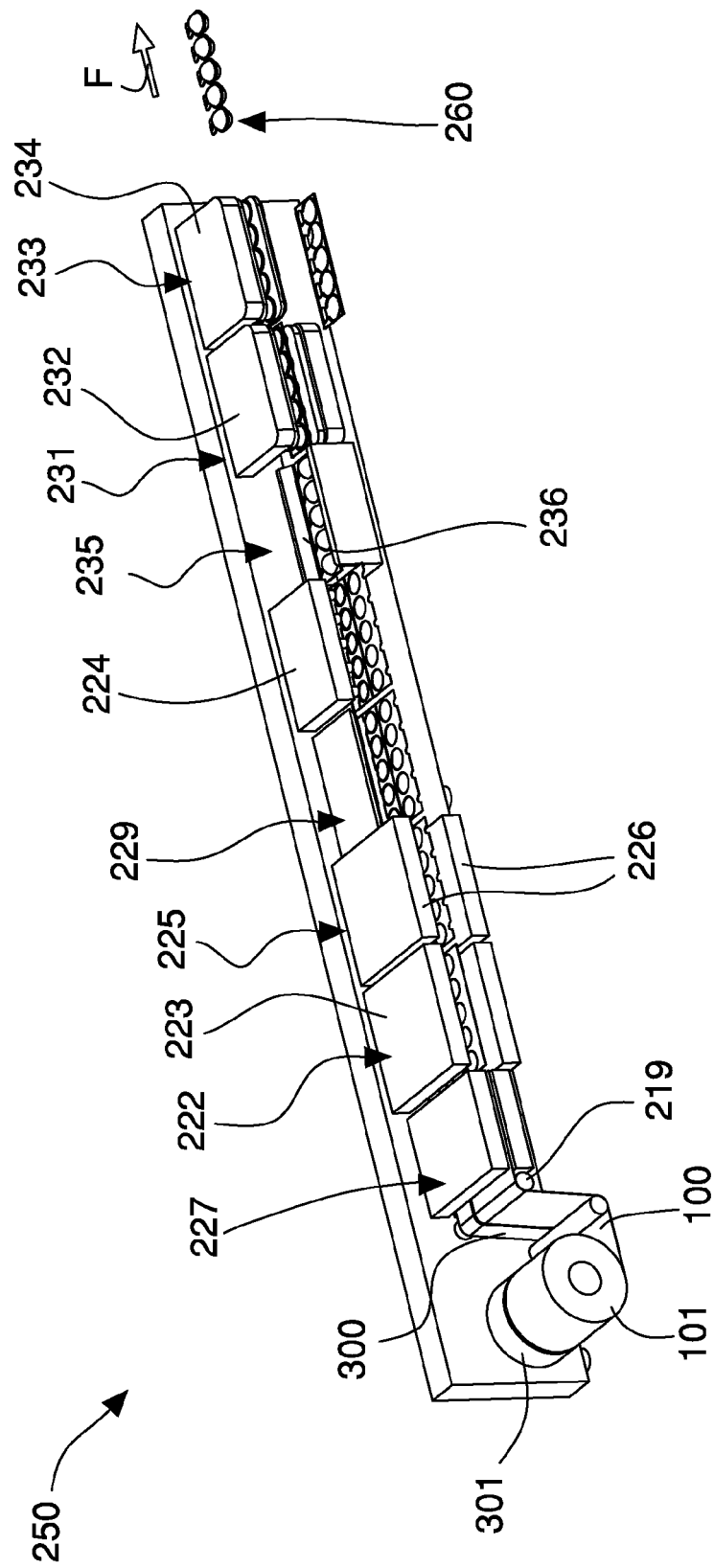


Fig. 38

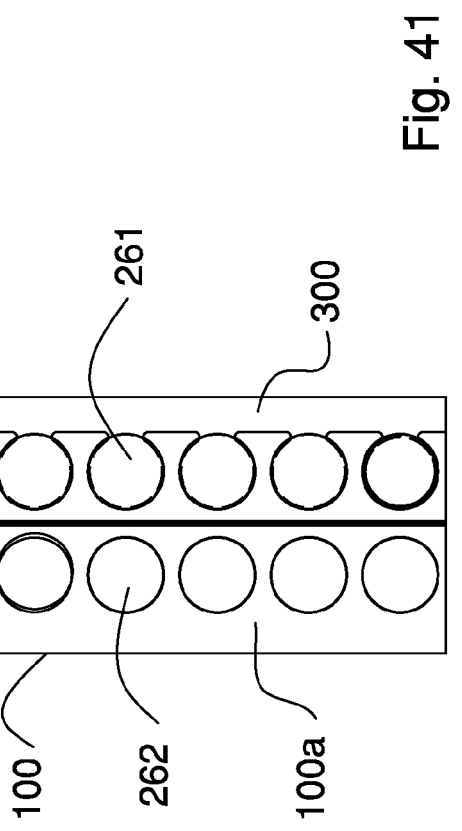
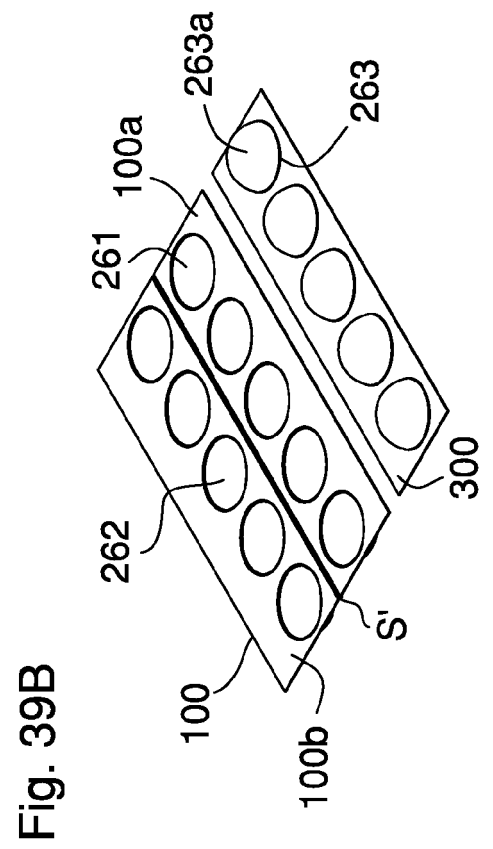
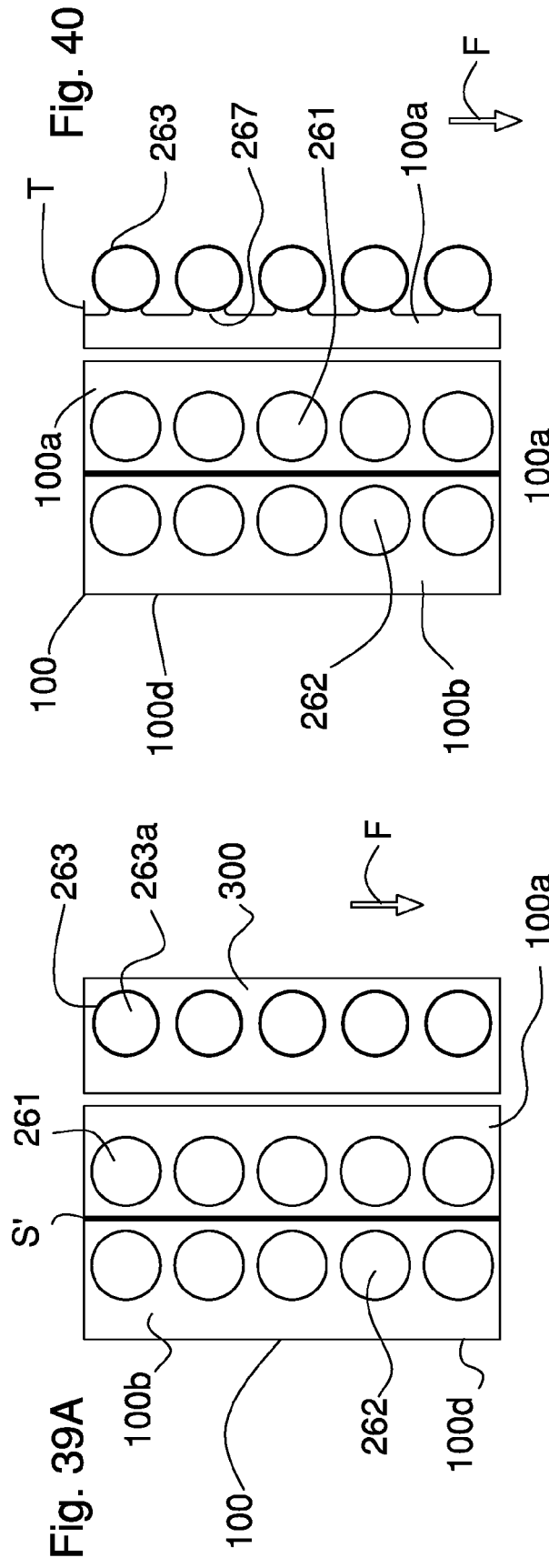


Fig. 43

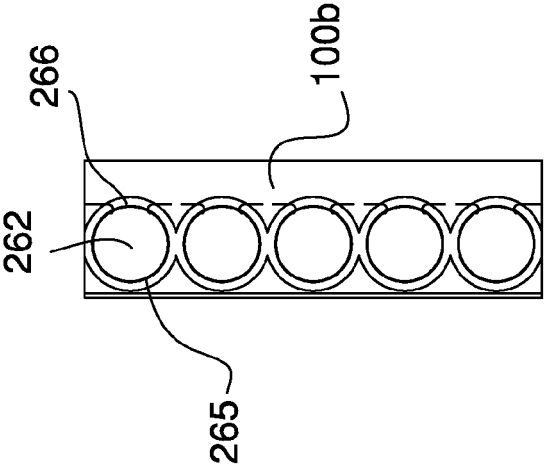


Fig. 42A

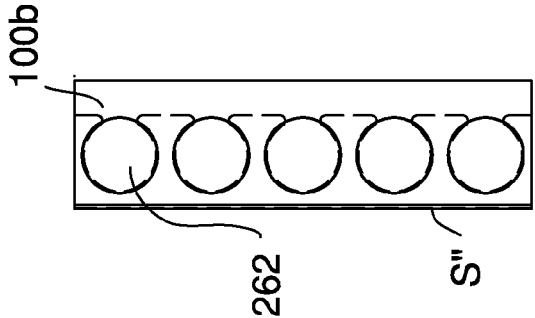


Fig. 42B

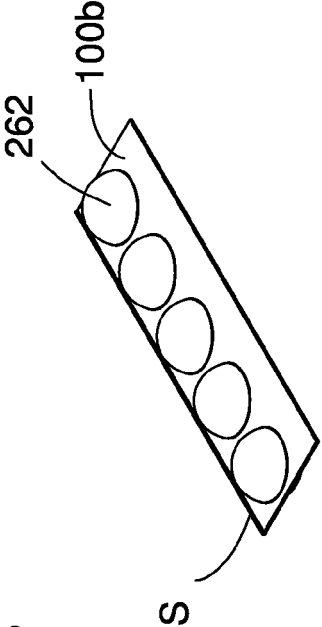


Fig. 44

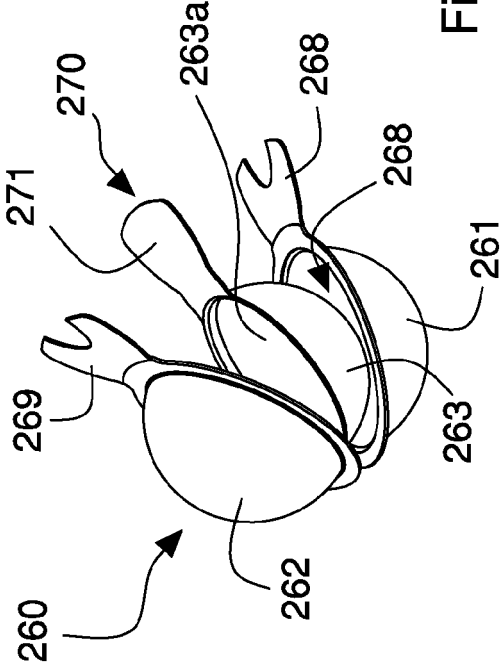


Fig. 46A

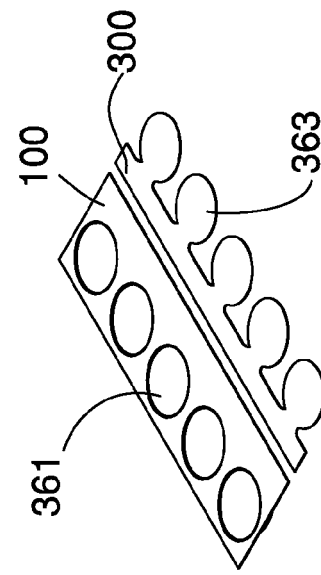
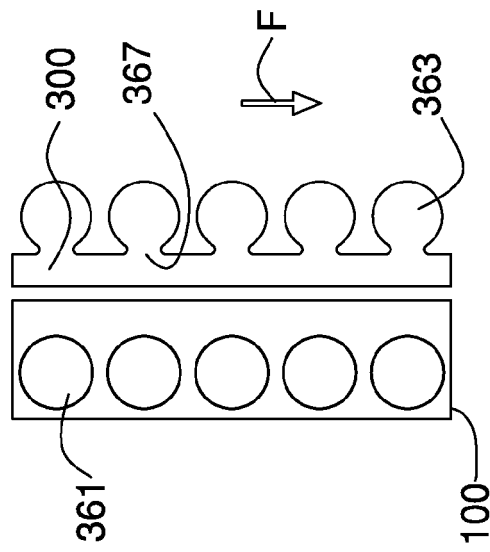


Fig. 46B

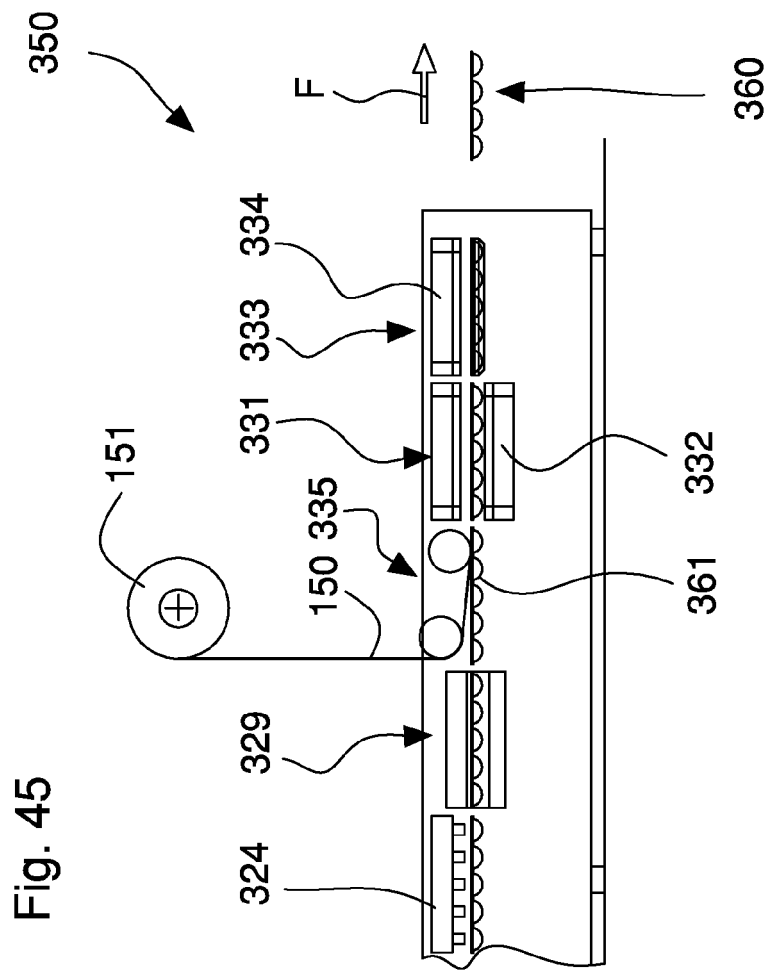


Fig. 45

Fig. 47

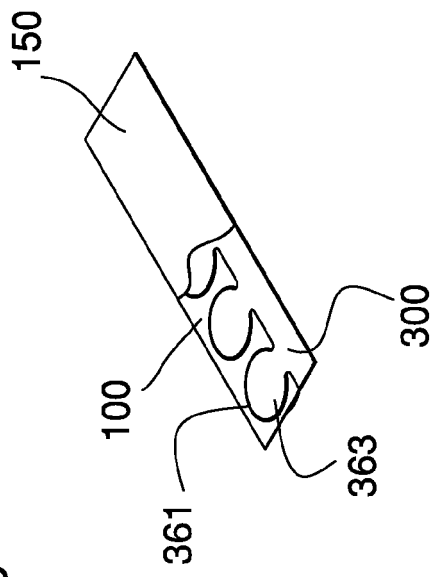


Fig. 48

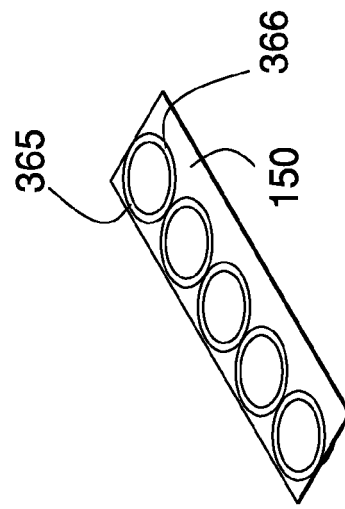
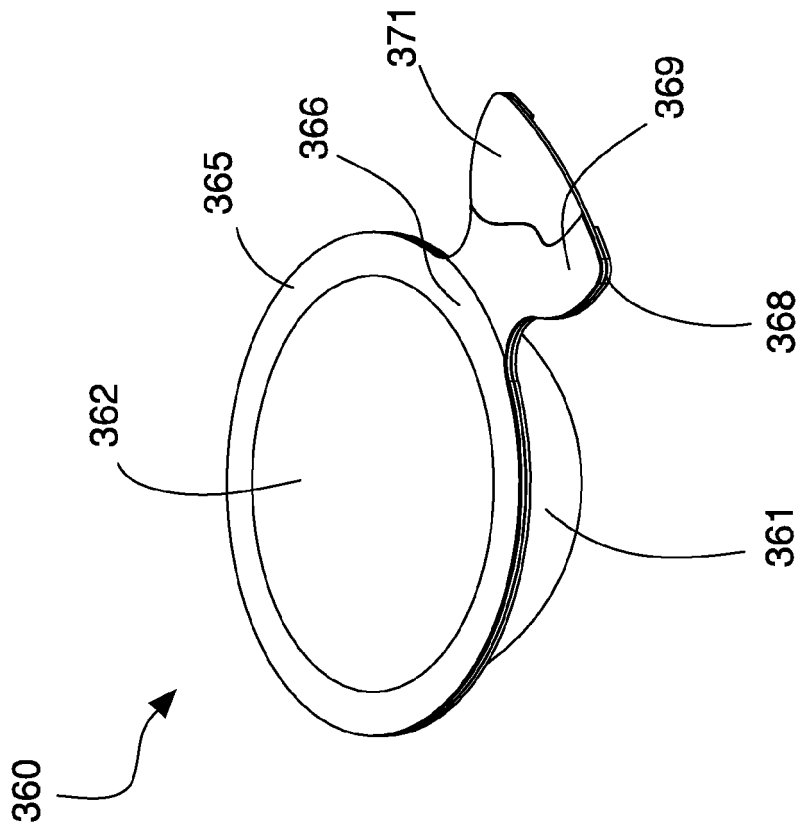


Fig. 49





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Place of search Munich		Date of completion of the search 24 February 2016	Examiner Damiani, Alberto
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Place of search Munich		Date of completion of the search 24 February 2016	Examiner Damiani, Alberto
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