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(73) Patenthaver: **STEVANATO GROUP INTERNATIONAL A. S., Agátová 22, 844 03 Bratislava, Slovakiet**

(72) Opfinder: **NICOLETTI, Fabiano, Lago di Lugano 4, I-30034 Mira, Italien**

(74) Fuldmægtig i Danmark: **PLOUGMANN & VINGTOFT A/S, Rued Langgaards Vej 8, 2300 København S, Danmark**

(54) Benævnelse: **PAKKESTRUKTUR TIL GLASBEHOLDERE TIL FARMACEUTISK ANVENDELSE**

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FR-A- 1 552 324
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The present invention refers to a package structure for glass, necked containers for pharmaceutical use.

Known is a package structure for sterilised syringes comprising a container with closed bottom holding therein a grid having a plurality of accommodation holes wherein arranged with a vertical orientation are the syringes held into position by simply placing their flange at the perimeter edge of the accommodation holes.

The system for holding a package structure for sterilised syringes is ineffective and unsuitable for holding functioning with bottles or similar containers not provided with projecting parts.

Such packaging structure for syringes has a limited flexibility in use in that it is not suitable to be used effectively both for containers different from syringes available in the market and machinery for filling containers different from syringes available in the market, for example glass bottles, carpules and phials for pharmaceutical use.

In particular, it is not possible to insert glass containers for pharmaceutical use into such structure for delivery to the pharmaceutical companies, ready to be filled.

US 5579929 discloses a device for holding test tubes, comprising a base plate spaced from a support surface. Therefore, the technical task proposed by the present invention is that of providing a package structure for glass, necked containers for pharmaceutical use capable of eliminating the technical drawbacks observed in the prior art.

Within the scope of this technical task an object of the invention is that of providing a package structure for glass, necked containers for pharmaceutical use capable of allowing to hold the containers into a preset position in a stable manner also in order to protect them against accidental breakages and in order to be able to deliver them to the pharmaceutical companies ready for filling.

Another object of the invention is that of providing a package structure for glass,

necked containers for pharmaceutical use capable of guaranteeing the sterilisation of the product, maintaining the sterility of the product, maintaining the quality characteristics of the product, proving the integrity of the product, identification and traceability of the product, transfer of the product without jeopardising the aforelisted properties.

Last but not least, an object of the invention is that of providing a package structure for glass, necked containers for pharmaceutical use capable of allowing an easy and quick step for loading glass containers into a process machine for handling thereof, in particular for filling, closure, packaging, etc thereof.

The technical task, as well as these and other objects, according to the present invention are attained by providing a package structure for glass, necked containers for pharmaceutical use according to claim 1.

Furthermore, other characteristics of the present invention are defined in the subsequent claims.

Further characteristics and advantages of the invention shall be clearer from the description of a preferred but not exclusive embodiment of the package structure for glass, necked containers for pharmaceutical use according to the finding, illustrated for indicative and non-limiting purposes in the attached drawings, wherein:

figure 1 shows a side elevated exploded view of a package structure for glass, necked containers for pharmaceutical use according to a preferred embodiment of the invention;

figure 2 shows a perspective exploded view of the package structure of figure 1;

figure 3 shows a cross-sectional view according to a vertical plane of the package structure of figure 1;

figure 4 shows an enlargement of a detail circled in figure 3;

figure 5 shows a cross-sectional view according to a vertical plane a package structure for glass an containers for pharmaceutical use according to an embodiment which does not form part of the invention but is useful for understanding the invention;

figure 6 shows an enlargement of a detail circled in figure 5;

figures 7 and 8 correspond to the embodiment of figures 5 and 6 but with the containers held overturned at a position of 180°;

figures 9 and 10 illustrate possible variants for the external protection casing of one or more trays of a package structure for glass, necked containers for pharmaceutical use according to the embodiment illustrated in the figures 1-4;

figure 11 shows a perspective view of a package structure for glass containers for pharmaceutical use according to an embodiment which does not form part of the invention but is useful for understanding the invention;

figure 12 shows a cross-sectional view according to a vertical plane of the package structure of figure 11;

figure 13 shows an enlargement of a detail circled in figure 12;

figure 14 shows the various sequential steps for the direct use of a package structure for glass, necked containers for pharmaceutical use in a process machine;

figure 15 shows a top plan view of a support plane according to an embodiment which does not form part of the invention but is useful for understanding the invention;

figure 16 shows a perspective view of an enlarged detail of the support plane of figure 15;

figure 17 shows a view of one of the two parts forming the support plane sectioned along line 17-17 of figure 15; and

figure 18 shows a view of the two assembled parts forming the support plane sectioned along line 17-17 of figure 15.

Identical parts in the various embodiments shall be indicated with the same reference number.

Referring to the abovementioned figures, a package structure for glass, necked containers for pharmaceutical use is shown indicated in its entirety with reference number 1.

The package structure 1 comprises a tray 2 accommodating - at an elevated position with respect to its bottom - a support plane 4 having a plurality of holes 12, spaced with a preset spatial order, for introducing the containers 6.

The holes 12 have a central symmetry axis S orthogonal with respect to the support plane 4.

The support plane 4 has - at each hole 12 - special elastically yielding means for holding a container 6 through a holding force radial with respect to the central symmetry axis S.

The holding means extend into the volume enclosed by the projection of the perimeter of the introduction hole 12 in a manner parallel with respect to the central symmetry axis S.

As is clear from the description and illustration of the preferred embodiment of the invention, the holding means can be arranged beneath the support plane 4, above the support plane 4, or co-planar with the introduction hole 12 and thus in a manner coplanar with the support plane 4. Optionally, as clear from the description and illustration of the preferred embodiment of the invention, the support plane 4 has - at each introduction hole 12 - support means 5 for bearing the weight of the container 6 also through a support force parallel with respect to the central symmetry axis S.

The introduction holes 12, which preferably - as shown - are circular-shaped, advantageously have a matrix order arranged in series of rows and columns which facilitates a possible automated movement and handling of the containers 6.

The tray 2 has a quadrangular bottom 7 raising from which are side walls 8.

The support plane 4 is supported perimetrally by a support shoulder 9 which develops along the internal surface of the side walls 8 of the tray 2.

The distance of the support plane 4 from the bottom 7 of the tray 2 must be such as to allow accommodating the containers 6 in the holes 12 in such a manner that they are held for their entire length of the space enclosed between the tray 2 and one of its closure covers 10.

The closure cover 10 is preferably a flexible flat sheet which can be applied for example through ultrasonic fastening against the flattened upper edge 11 of the side walls 8 of the tray 2 in a way to be removed therefrom through simple exfoliation, that is by pulling a special strip of the sheet.

In the preferred embodiment illustrated in figures 1-4 the means for holding the container 6 comprise, for each hole 12, flaps 13 adapted to elastically fit under a bulged section of the upper part of the neck of the container 6.

In particular, the flaps 13 are inclined with respect to the axis of symmetry(s) of the holes (12).

In this case, both the centred holding of the container 6 and the support of its weight are ensured only by the elastic flaps 13.

As a matter of fact, their first axial component generates a force ensuring the centred holding of the container 6 in the introduction hole 12 while their second axial component generates a force operating for supporting the weight of the container 6.

On the other hand, in the embodiment illustrated in figures 5-8 which is not part of the invention, the means for holding the container 6 comprise, for each hole 12, at least one rib 14 which develops along a centred circumference on the central symmetry axis S and adapted to elastically fit against the external parameter of the side wall of the container 6.

In this case, the support means 5 for bearing the container 6 comprise a basket 16 projecting from the support plane 4 beneath the hole 12, and the rib 14 is provided right along the side surface of the basket 16.

Thus, the container 6 is arranged in the basket 16 whose base 17 serves as a support for the base (figures 7 and 8) or for the head (figures 5 and 6) of the container 6.

Contrary to the embodiment illustrated in figures 5-8 wherein the support plane 4 is borne in the tray 2, in the embodiment illustrated in figures 11-13 which is not part of the invention, the tray 2 and the support plane 4 are integrated into a single piece. Alongside implying a more limited number of parts, the latter solution can have a small overall dimension in terms of height and it is suitable especially for use in short containers. Given that the containers 6 are placed at the bottom of the tray 2 the height of the tray 2 must be only slightly greater than the height of the containers 6 in such a manner to be able to hold them entirely therein.

On the other hand, referring to embodiments illustrated in figures 15-18 which are not part of the invention, the flaps 13 develop inside the introduction hole 12 with a longitudinal development axis radially directed towards the central symmetry axis S.

In this case, the support plane 4 has two flat parts 4a and 4b formed in a mirror-like manner and mutually fastenable in an overlapped position by means of a bayonet fastening system which develops perimetrally on the support plane 4 and provides for mutual engagement members 42 and 43 respectively, one of which is provided with a snap-tooth 40 couplable into a special snap-seat 41 of the other

by means of relative translation sliding between the flat part 4a and the flat part 4b for example along a translation axis parallel to the greater axis of the support plane 4.

Preferably, also provided for is a system for locking the flat part 4a and the flat part 4b in the final configuration of complete overlapping.

The locking system, also provided for perimetrally on the support plane 4 and more precisely at the sides of the support plane 4 orthogonal to the axis of mutual translation between the flat parts 4a and 4b, comprise at least one hook 46 which can be snap-fitted into an engagement hole 47 preferably accessible only by means of a special tool for the subsequent disengagement of the hook 46.

The flaps 13 are at least two and they are provided for one on the flat part 4a and one on the flat part 4b in a manner such to be arranged diametrically in the introduction hole 12 for grasping on the diameter of the neck of the container 6 when the flat part 4a and the flat part 4b are entirely overlapped.

In this case, the introduction hole 12 has radial protrusions 44 adapted to increase the longitudinal development of the flaps 13 and reduce their portion for attaching against the support plane 4 to increase their elastic flexibility.

In this embodiment, the means 5 for supporting the container 6 comprise an internal flange 45 of the introduction hole 12 for supporting the base of the head of the container 6.

The flange 45 extends into the introduction hole 12 for a radial section smaller than the one with which the flaps 13 extend into the introduction hole so as not to interfere with the hole of the container 6.

The flange 45 is subdivided into at least two portions - one borne by the flat part 4a and the other by the flat part 4b - in such a manner to be aligned diametrically in the introduction hole 12 when the flat part 4a and the flat part 4b are entirely overlapped.

The implementation of the forces by the flaps 13 and the flange 45 at diametrically opposite ends of the container 6 allows providing a safe and stable holding in centred position of the container 6.

The tray 2 advantageously has means 30 for the identification and traceability of the product contained in the container 6, preferably an identification code of the RFID type.

The package structure 1 is completed by at least one external protection casing 18 which encloses a tray 2 therein, and allows its transfer to an area with a controlled environment (e.g.: an area where the glass containers are filled for pharmaceutical use).

The protection casing 18 can be closed (figure 10) or open and in particular provided with at least one opening 19 for quick transfer (figure 9).

Each protection casing 18 can contain one or more stacked trays 2.

The protection casing 18 is preferably made up of a bag or a plastic sheet.

Now, referring to figure 14 shown is the package structure 1 for directly delivering - in an automatic manner - the containers 6 with a spatially preset position to a process machine 20 for their handling thereof.

The process machine 20 which does not form a part of the invention comprises a robotised arm 21 provided with a head 22 for grasping the containers 6.

The robotised arm 21 has a horizontal translation axis X, a vertical translation axis Y and a rotation axis Z orthogonal to the translation axis X and Y.

The grasping head 22 has an open rectilinear groove 23 for grasping a row of containers 6.

After being extracted from the external casing 18 and being removed of the cover

10, the support plane 4 (or the tray 2 if integral with the support plane 4) is moved towards the grabbing position by the grabbing head 22 wherein the containers 6 are arranged in rows oriented in a manner parallel to the axis X.

In particular, the grabbing head 22 is initially external with respect to the support template 4 and has a groove 23 oriented in a manner parallel to the axis X.

The grabbing head 22 translates along axis X to insert the groove 23 into the neck of the row of containers 6 aligned with the groove 23 itself.

After having engaged the row of containers 6, the grabbing head 22 translates along axis Y to lift the row of containers 6 engaged detaching it from the support 4.

Subsequently, the grabbing head 22 translates along axis X to transport the engaged row of containers 6 towards a conveying station 24 at which the grabbing head 22 rotates around axis Z to slide the engaged row of containers 6 towards it.

The package structure for glass, necked containers for pharmaceutical use thus conceived is susceptible to various modifications and variants, all falling within the scope of the invention as defined by the claims; furthermore, all the details can be replaced by technically equivalent elements.

In practice, all the materials used, alongside the dimensions, may vary depending on the requirements and the state of art.

Patentkrav

1. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse , **kendetegnet ved at** den omfatter en bakke (2) som - ved en hævet position i forhold til dens bund – har et støtteplan (4) som til indføring af beholderne, har en flerhed af åbninger (12) i afstand fra hinanden med forvalgt rumlig rækkefølge og med en midtersymmetriakse (S) retvinklet til støtteplanet (4), idet støtteplanet (4) yderligere omfatter, ved hver af disse åbninger (12), elastisk flydende fleksibelt organ til at holde en beholder (6) ved hjælp af en holdekraft radial i forhold til midtersymmetriaksen (S), hvilket elastisk flydende fleksible organ strækker sig til volumenet omsluttet af fremspringet af omkredsen af hver af disse åbninger (12) på en måde parallelt med midtersymmetriaksen (S), idet det elastisk flydende fleksible organ omfatter klapper (13) tilpasset til at holde beholderen (6) under en udbulet del af den øvre del af beholderhalsen.

2. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge det foregående krav, **kendetegnet ved at** bakken (2) har organ til identifikationen og sporbarhed af produktet indeholdt i beholderne (6).

3. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** den har mindst et ydre beskyttelseshus (18) der rummer bakken (2), hvilket hus (18) er lukket eller har mindst én hurtig overførselsåbning (19) til overførslen af pakkestrukturen (1) ind i områder med en kontrolleret atmosfære.

4. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** åbningerne (12) har en matriks-rækkefølge arrangeret i en serie af rækker og søjler.

5. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** klapperne (13) skråner i forhold til åbningernes (12) symmetriakse (S).

6. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** det elastisk flydende

fleksible organ er anbragt neden under støtteplanet (4).

7. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** det elastisk flydende fleksible organ er anbragt over støtteplanet (4).

8. Pakkestruktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav, **kendetegnet ved at** det elastisk flydende fleksible organ er i samme plan som indføringsåbningen (12).

9. Anvendelse af en struktur (1) til glasbeholdere med hals til farmaceutisk anvendelse ifølge et eller flere af de foregående krav til levering af beholderne direkte i en afstand forvalgt position til en bearbejdningsmaskine til håndtering deraf.

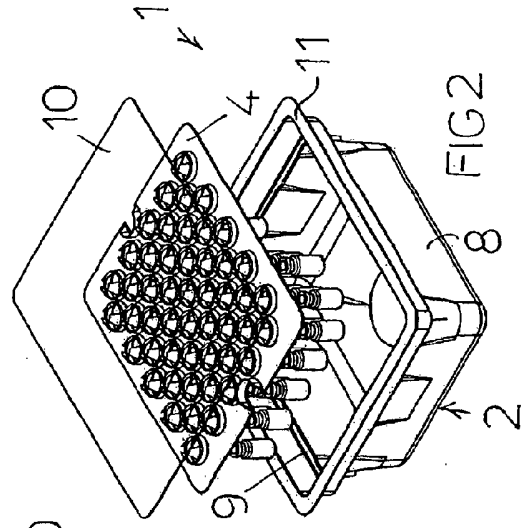


FIG2

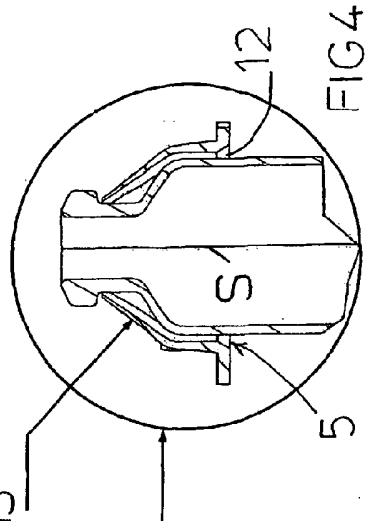


FIG4

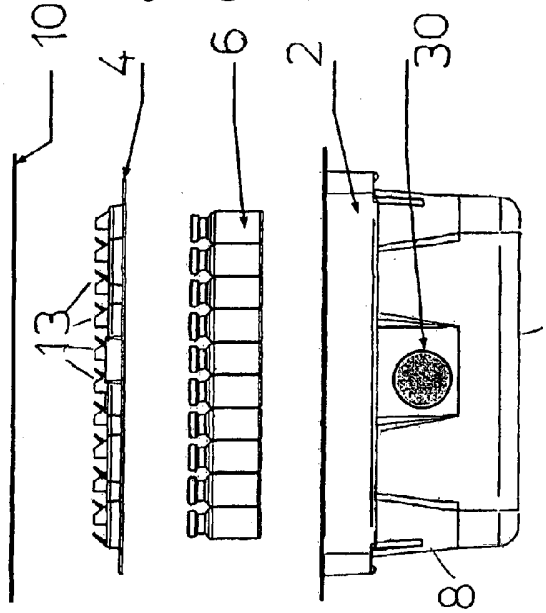


FIG1

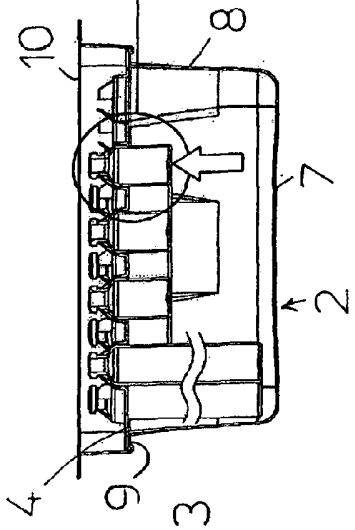


FIG3

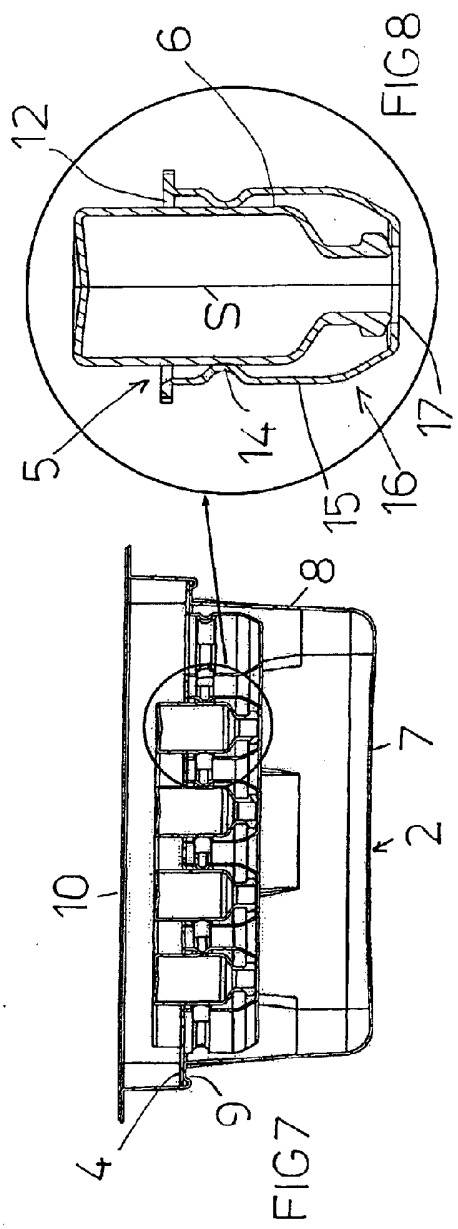


FIG7

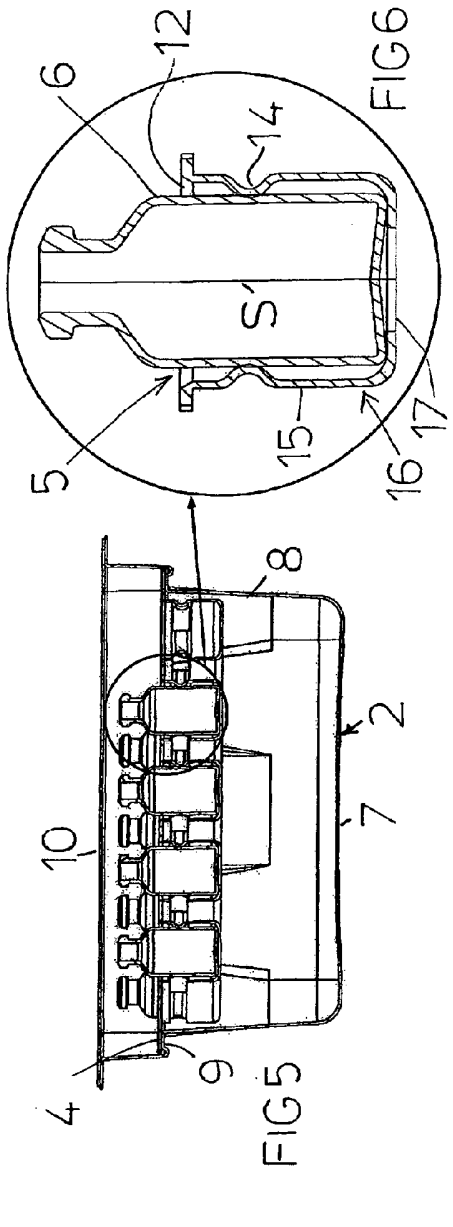


FIG5

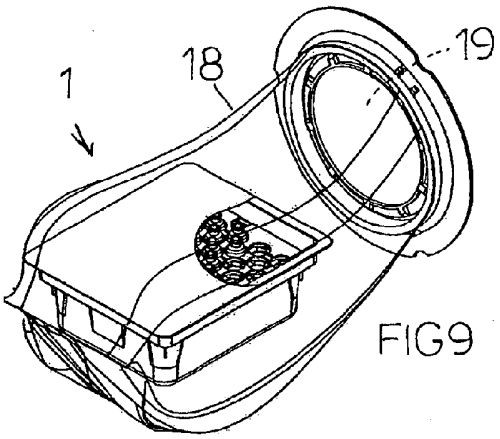


FIG9

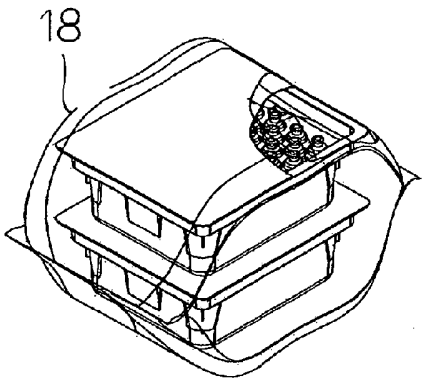


FIG10

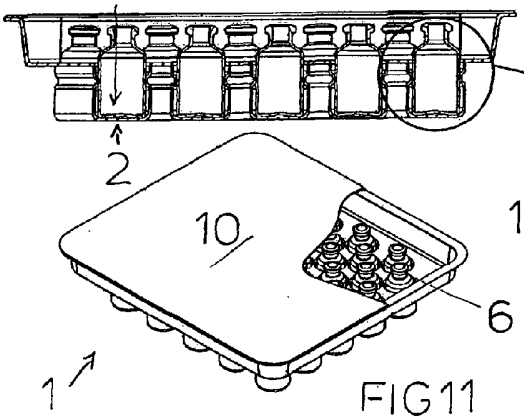


FIG12

FIG11

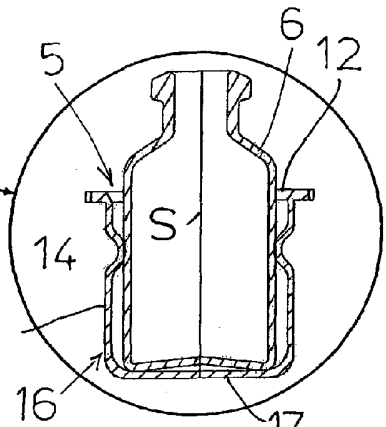


FIG13

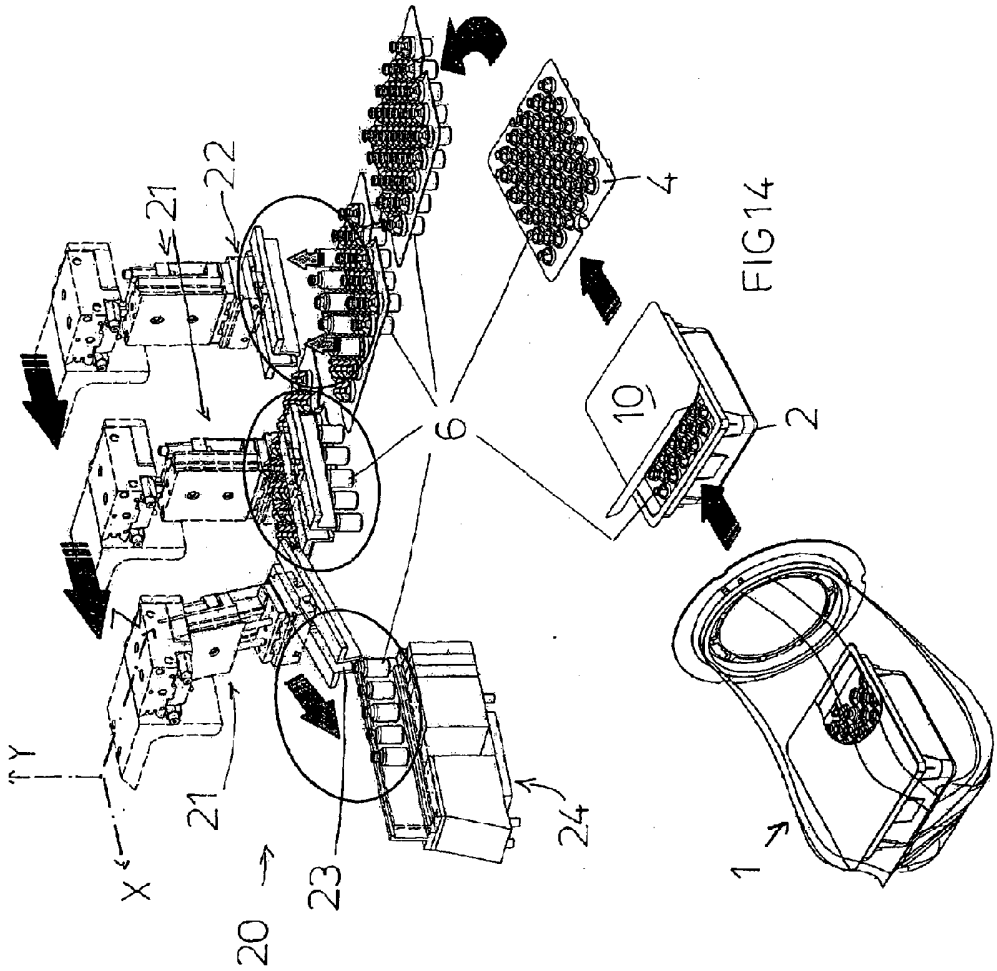
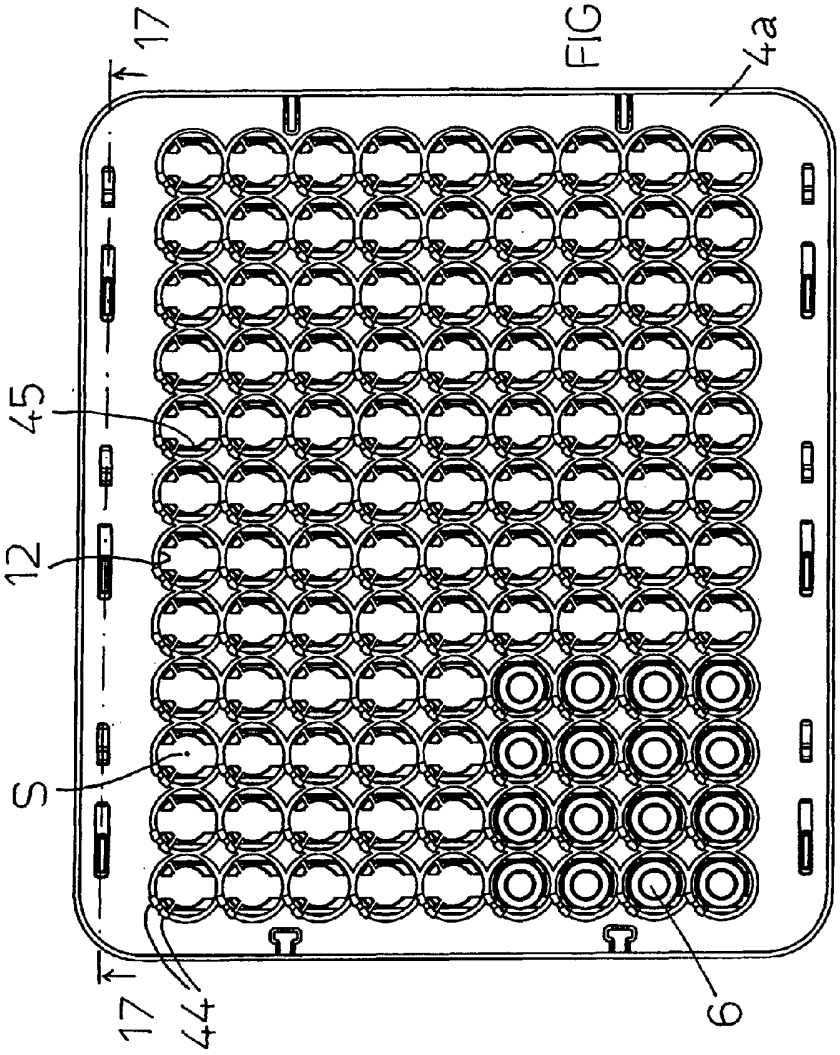


FIG14

FIG15



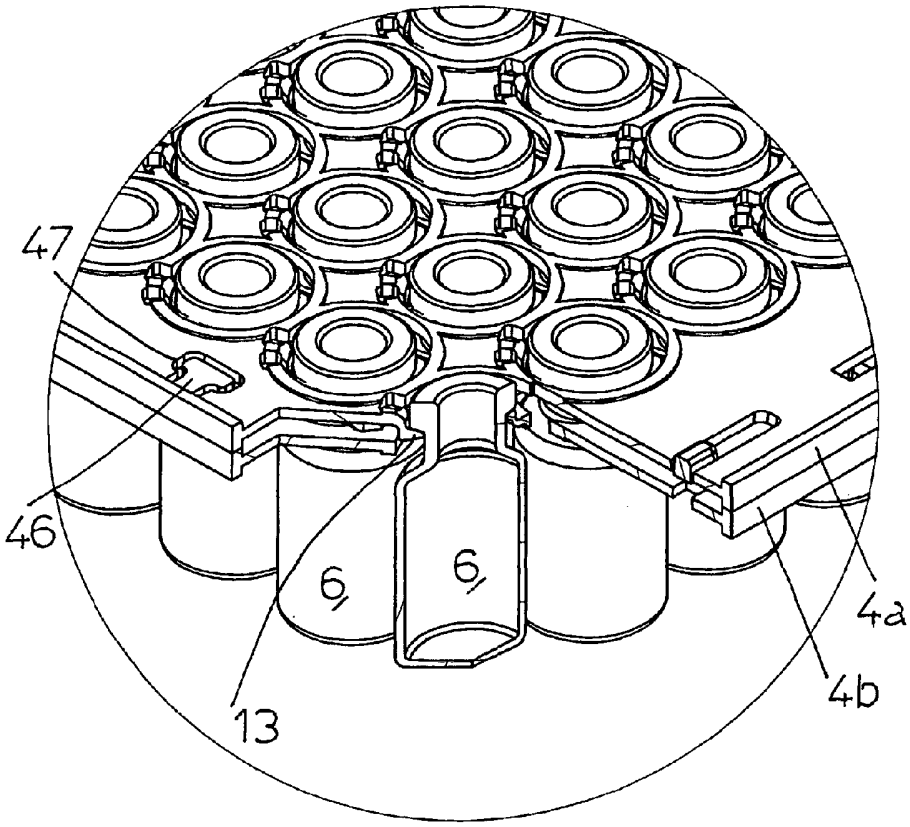


FIG 16

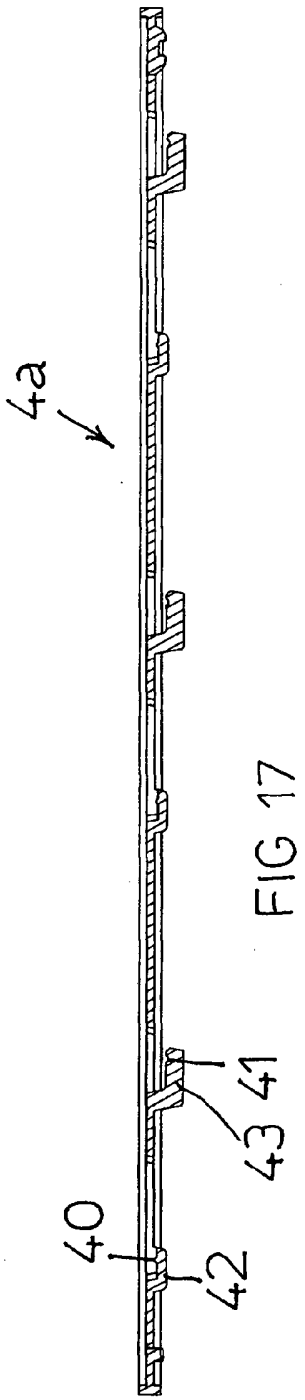


FIG 17

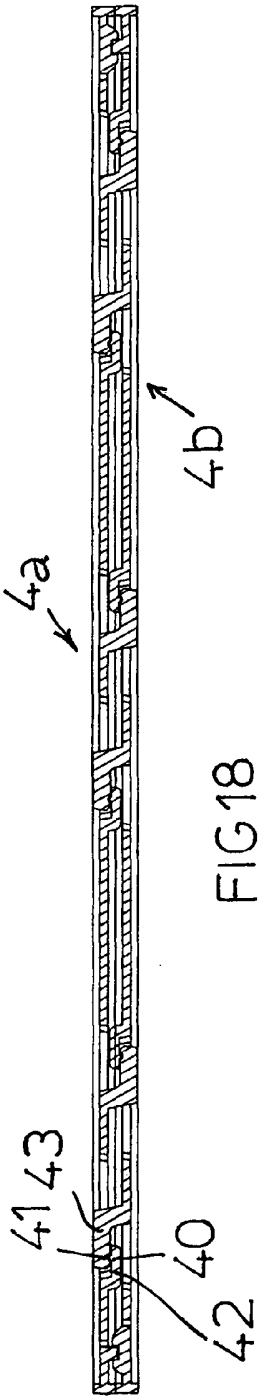


FIG18

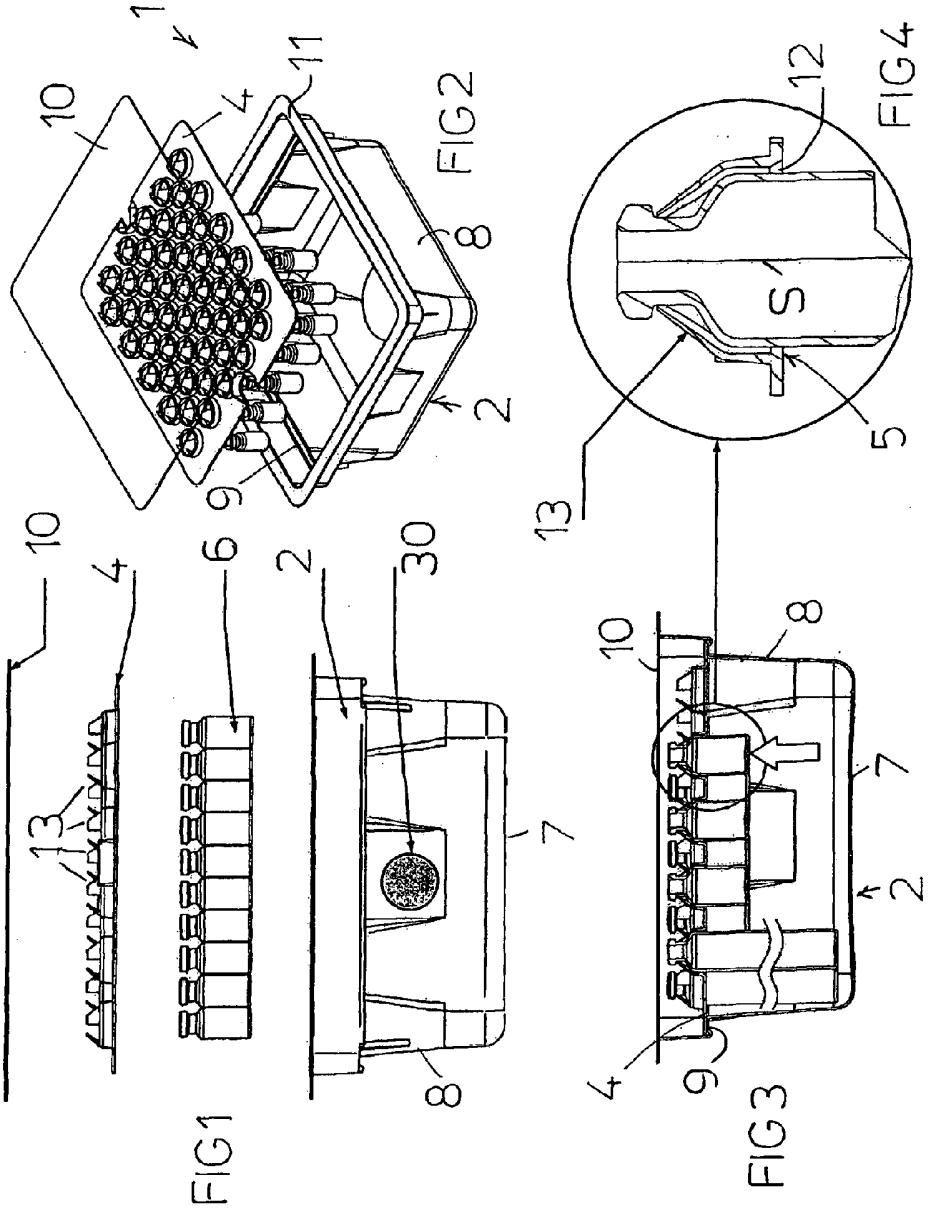

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FIG3