



Office de la Propriété

Intellectuelle  
du Canada

Un organisme  
d'Industrie Canada

Canadian  
Intellectual Property  
Office

An agency of  
Industry Canada

CA 2617455 C 2011/10/11

(11)(21) **2 617 455**

(12) **BREVET CANADIEN  
CANADIAN PATENT**

(13) **C**

(22) Date de dépôt/Filing Date: 2008/01/09

(41) Mise à la disp. pub./Open to Public Insp.: 2008/07/11

(45) Date de délivrance/Issue Date: 2011/10/11

(30) Priorité/Priority: 2007/01/11 (JP2007-003313)

(51) Cl.Int./Int.Cl. *A61M 37/00* (2006.01),  
*B65D 75/32* (2006.01), *B65D 85/00* (2006.01)

(72) Inventeurs/Inventors:

OKADA, KATSUHIRO, JP;  
IWAQ, YOSHIHIRO, JP;  
MATSUOKA, KENSUKE, JP

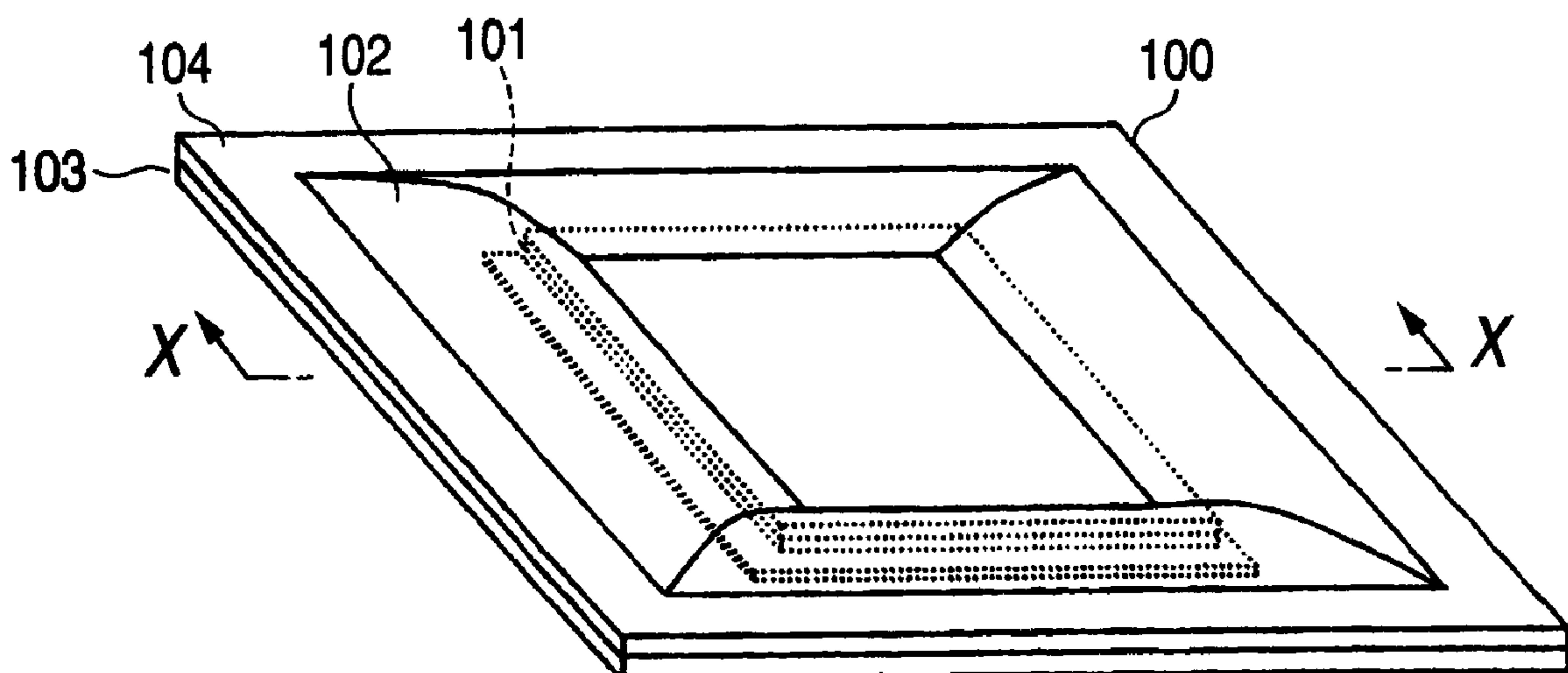
(73) Propriétaire/Owner:

NITTO DENKO CORPORATION, JP

(74) Agent: RICHES, MCKENZIE & HERBERT LLP

(54) Titre : STRUCTURE DE PIECES RAPPORTEES

(54) Title: PATCH PACKAGE STRUCTURE



(57) Abrégé/Abstract:

The present invention provides a patch package structure, which includes: a package including a first sheet material which is planar and a second sheet material which has been molded, the first and second sheet materials being sealed together in peripheral parts thereof, and a patch disposed in the package, in which the patch contains a backing, a pressure-sensitive adhesive layer laminated on at least one side of the backing, and a release liner which protects a pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer; the second sheet material has been molded so as to have a protrudent part in at least a substantially central area thereof, the protrudent part having a planar outer shape larger than a planar outer shape of the release liner and having at least one recessed part; d is not smaller than T, in which d is the minimum gap distance between the inner surface of the first sheet material and the inner surface of the second sheet material at the recessed part and T is a thickness of the patch; and, at the boundary between the sealed part where the first and second sheet materials are sealed together and an unsealed part, the outer surface of the second sheet material rises at an obtuse angle.

## ABSTRACT OF THE DISCLOSURE

The present invention provides a patch package structure, which includes: a package including a first sheet material which is planar and a second sheet material which has been molded, the first and second sheet materials being sealed together in peripheral parts thereof, and a patch disposed in the package, in which the patch contains a backing, a pressure-sensitive adhesive layer laminated on at least one side of the backing, and a release liner which protects a pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer; the second sheet material has been molded so as to have a protrudent part in at least a substantially central area thereof, the protrudent part having a planar outer shape larger than a planar outer shape of the release liner and having at least one recessed part;  $d$  is not smaller than  $T$ , in which  $d$  is the minimum gap distance between the inner surface of the first sheet material and the inner surface of the second sheet material at the recessed part and  $T$  is a thickness of the patch; and, at the boundary between the sealed part where the first and second sheet materials are sealed together and an unsealed part, the outer surface of the second sheet material rises at an obtuse angle.

## PATCH PACKAGE STRUCTURE

### FIELD OF THE INVENTION

The present invention relates to a patch package structure which includes: a  
5 package including a first sheet material which is planar and a second sheet material  
which has been molded, the first and second sheet materials being sealed together in  
peripheral parts thereof; and a patch disposed in the package.

### BACKGROUND OF THE INVENTION

10 Patches to be applied to the skin for the purpose of, e.g., protecting the  
affected part and adhesive preparations to be applied to a surface of the skin of a  
mammal for the purpose of percutaneously administering a drug to the mammal have  
hitherto been developed. Recently, soft pressure-sensitive adhesive layers such as  
those holding a large amount of a liquid component therein tend to be employed for the  
15 purpose of obtaining a soft wear feeling during wear of the patch or reducing the skin  
irritation caused by separation of the horny layer upon stripping of the patch. With  
regard to adhesive preparations in which the pressure-sensitive adhesive layer contains a  
drug, a pressure-sensitive adhesive layer having a larger thickness is frequently  
employed in recent adhesive preparations so that the pressure-sensitive adhesive layer  
20 holds a large amount of a drug. In such a case, there may arise a trouble that the  
pressure-sensitive adhesive layer protrudes from an edge of the patch during storage and  
adheres to the inner surfaces of the package, whereby it becomes difficult to take out the  
patch out of the package. This tendency is significant when the pressure-sensitive  
adhesive layer is thick, since the amount of the pressure-sensitive adhesive layer is large.  
25 Various proposals have been made in order to overcome those problems.  
For example, JP-T-10-511330 (herein, the term "JP-T" as used herein means a  
published Japanese translation of a PCT patent application) discloses a package for

disposing therein a patch to be applied to the skin (in this document, the structure composed of a pressure-sensitive adhesive layer and a backing excluding a release liner is referred to as "patch"). An example of this package is shown in Fig. 8.

This package is constituted of a blister pack 12 in a container form and a cap 5 14 in a sheet form, and a patch 1 is disposed in this package. In this package, the blister pack 12 in a container form has a central part 18 which is almost flat and horizontal and a peripheral outer part 22 which is deeper than the central part. The patch 1 has been attached to a release liner 3 larger than the patch. Owing to such a shape of the blister pack and the large release liner, peripheral parts of the patch 1 do 10 not come into contact with any part of the package. There is a statement therein to the effect that the pressure-sensitive adhesive can be thus prevented from leaking out through the peripheral parts or lower side (release liner side) of the patch 1 and thereby bonding the patch 1 to the package.

However, since the blister pack 12 of this package is in the form of a 15 container, the package as a whole becomes thick. Accordingly, the overall volume of this package becomes far larger than the patch itself. Consequently, this package is not fully satisfactory from the standpoints of the production cost thereof and the cost of handling including the transportation of packaged products.

An Example given in that document teaches that the constitution including 20 an outer wall 24 having a substantially vertical upper region and the like enhance the overall strength of the package 10. However, the package described in this Example is thick as a whole as well as the angle formed by the outer wall 24 and the flange 26 in the blister pack (rising angle) is almost a right angle. Therefore, this package has such a drawback that, when the package is opened by cutting from the sealed part to the 25 blister pack with scissors, a considerable power is necessary for the scissoring and, as a result, there is a possibility that the patch placed therein might be accidentally cut together with the package or, in the worst case, the scissors might injure the hand.

Furthermore, a laminated packaging material obtained by laminating sheet materials may be used as the material of the blister pack. In this case, there is a possibility that, when a blister pack having such a substantially right-angled bent part is molded from the sheet-form laminate packaging material, the blister pack thus obtained 5 might suffer laminate failures such as delamination at the bent part. Especially in the case of a packaging material including an aluminum foil, there is a possibility that the aluminum foil might crack or otherwise break. In such a case, there is a possibility that the package structure might be impaired in impermeability to the package contents such as a drug, or in impermeability to light rays or gases, resulting in impaired quality 10 stability of the package contents.

In this document, there is a statement to the effect that the depth (gap distance) of the central part of the blister pack from the cap is sufficiently larger than the total thickness of the patch and the release liner so that the patch and the release liner can move freely, whereby the patch is prevented from being pressed and the 15 pressure-sensitive adhesive is hence prevented from being squeezed out from the downside of the patch (on the release liner side). There also is a statement to the effect that the outer part of the blister pack should also have a sufficient depth in order to prevent the pressure-sensitive adhesive from leaking out through edges of the patch and then coming into contact with the bottom of the blister pack. As described above, this 20 document does not suggest a thin package structure.

On the other hand, a patch package structure obtained without using a so-called blister pack has been conventionally utilized. It is produced by sandwiching a patch between two pieces of flexible sheet-form packaging materials having a slightly larger planar outer shape than the patch and then sealing the two pieces of flexible 25 sheet-form packaging materials together in peripheral parts thereof. For example, JP-UM-B-4-51782 discloses a bag container obtained by sealing two pieces of planar sheet materials together in peripheral parts thereof, and an example of the bag container is

shown in Fig. 9. However, since such a bag container is constituted of two pieces of planar flexible sheet materials, it has the following drawback. Namely, since a load is apt to be imposed on the patch in the thickness direction therefor and the patch freely moves in the bag container, the pressure-sensitive adhesive layer protruded from 5 peripheral parts of the patch comes into contact with the inner surfaces of the bag container and the components of the pressure-sensitive adhesive layer thus adhere to the inner surfaces of the bag container, whereby it often becomes difficult to take out the patch out of the bag container. This tendency is significant especially when the 10 pressure-sensitive adhesive layer contains a large amount of a liquid component or the pressure-sensitive adhesive layer is soft or thick.

Under such circumstances that a pressure-sensitive adhesive layer containing a large amount of a liquid component, a soft pressure-sensitive adhesive layer, or a thick pressure-sensitive adhesive layer is employed, a technique for preventing components of the pressure-sensitive adhesive layer of a patch from 15 adhering to the inner surfaces of the package to thereby secure the ease of taking the patch out of the package has become increasingly important in recent years.

## **SUMMARY OF THE INVENTION**

In view of the above, an object of the invention is to provide a patch 20 package structure which enables the patch to be easily taken out of the package.

Such an object of the invention can be unexpectedly accomplished with a compact and simple package prepared by sealing a planar sheet material and a sheet material molded in a given shape, and a given patch. Accordingly, the present invention relates to the followings.

25 (1) A patch package structure, which comprises:  
a package comprising a first sheet material which is planar and a second sheet material which has been molded, said first and second sheet materials being sealed

together in peripheral parts thereof; and

a patch disposed in the package,

wherein the patch comprises a backing, a pressure-sensitive adhesive layer

laminated on at least one side of the backing, and a release liner which protects a

5 pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer,

wherein the second sheet material has been molded so as to have a  
protrudent part in at least a substantially central area thereof, said protrudent part having  
a planar outer shape larger than a planar outer shape of the release liner and having at  
least one recessed part,

10 wherein  $d$  is not smaller than  $T$ , in which  $d$  is the minimum gap distance  
between the inner surface of the first sheet material and the inner surface of the second  
sheet material at the recessed part and  $T$  is a thickness of the patch, and

wherein, at the boundary between the sealed part where the first and second  
sheet materials are sealed together and an unsealed part, the outer surface of the second  
15 sheet material rises at an obtuse angle.

(2) The package structure according to (1) above, wherein the

release liner of the patch has a planar outer shape larger than a planar outer shape of the  
pressure-sensitive adhesive layer.

(3) The package structure according to (1) or (2) above,

20 wherein the patch is disposed in the package in such a way that the release  
liner faces the inner surface of the first sheet material,

wherein the release liner has a cut line, and

wherein the recessed part of the second sheet material is positioned in such a  
way that the recessed part does not come into contact with a part of the backing which  
25 corresponds to the cut line.

(4) The package structure according to any one of (1) to (3) above,

wherein the protrudent part has two or more recessed parts.

(5) The package structure according to any one of (1) to (4) above, wherein the pressure-sensitive adhesive layer contains a liquid component.

(6) The package structure according to any one of (1) to (5) above, wherein the patch is an adhesive preparation comprising a pressure-sensitive adhesive

5 layer containing a drug.

The patch package structure of the invention includes a first sheet material which is planar and a second sheet material which has been molded, in which the second sheet material has been molded so that it has a protrudent part in at least a substantially central area thereof, the protrudent part having a outer shape larger than

10 that of the patch and having at least one recessed part therein.

Since the recessed part functions to support the patch, and the inner surface of the protrudent part of the second sheet material is kept apart from peripheral parts of the pressure-sensitive adhesive layer of the patch, the peripheral parts of the pressure-sensitive adhesive layer are less apt to come into contact with the inner surface of the second sheet material. Accordingly, even if the components of the pressure-sensitive adhesive layer protrudes during storage of the patch, the components of the pressure-sensitive adhesive layer are less apt to come into contact with the inner surface of the second sheet material. On the other hand, since the minimum gap distance  $d$  between the inner surface of the first sheet material and the inner surface of the second sheet

20 material at the recessed part thereof is not smaller than the thickness of the patch  $T$  in the patch package structure of the invention, a load is less apt to be imposed on the patch in the thickness direction therefor. Since the components of the pressure-sensitive adhesive layer are thus inhibited from protruding from peripheral parts of the pressure-sensitive adhesive layer of the patch, the patch is less apt to adhere to the inner

25 surfaces of the package, and therefore, the patch can be easily taken out of the package.

In the case that the patch disposed in the package is one in which the release liner has a planar outer shape larger than that of the pressure-sensitive adhesive layer,

even when the patch moves in the package during the storage or transportation of the package structure, the parts which may come into contact with the inner surface of the first sheet material and the inner surface of the second sheet material are limited to peripheral parts of the release liner of the patch, and peripheral parts of the pressure-sensitive adhesive layer come into contact with neither the inner surface of the first sheet material nor the inner surface of the second sheet material. Consequently, even if the components of the pressure-sensitive adhesive layer of the patch protrude from peripheral parts of the pressure-sensitive adhesive layer in this case, the components of the pressure-sensitive adhesive layer are less apt to adhere to the inner surfaces of the package, and therefore, the patch can be very easily taken out of the package.

Furthermore, the outer surface of the second sheet material has a rising part at the boundary between the sealed part of the first sheet material and second sheet material and an unsealed part, and the rising angle thereof is an obtuse angle. Namely, the rising angle is smaller than 180 degrees. Due to this feature coupled with having the recessed part and protrudent part already described above, the package structure of the invention has an advantage that peripheral parts of the pressure-sensitive adhesive layer of the patch are less apt to come into contact with the second sheet material, in comparison with the conventional package structure in a flat bag form obtained by sealing two pieces of planar sheet materials in peripheral parts thereof.

On the other hand, since the rising angle is an obtuse angle, i.e., is larger than 90 degrees and smaller than 180 degrees, the package structure as a whole can be made thin.

Furthermore, since the rising angle is an obtuse angle, there is only a small possibility that the use and molding of a laminated packaging material as the second sheet material might result in a laminate failure such as delamination. Especially in the case of a packaging material including an aluminum foil, the possibility that the aluminum foil itself might crack or otherwise break is small. Consequently, the

impermeability to package contents such as a drug, light rays, or gases is less apt to decrease and the quality stability of the patch packaged becomes high.

Moreover, since the rising angle is larger than 90 degrees, when the package is opened by cutting from the sealed part to the unsealed part with scissors, a lot of

5 power is not necessary and the package can be smoothly opened. As a result, the possibility that the patch might be accidentally cut or the scissors might injure the hand is sufficiently low, and the package structure hence has satisfactory handleability.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

10 Fig. 1 is a slant view of an embodiment of the patch package structure of the invention.

Fig. 2 is a sectional view of the embodiment of the patch package structure of the invention.

Fig. 3 is a slant view of an example of the patch.

15 Fig. 4 is a sectional view of another embodiment of the patch package structure of the invention.

Fig. 5 is a sectional view of still another embodiment of the patch package structure of the invention.

20 Fig. 6 is a sectional view of a further embodiment of the patch package structure of the invention.

Fig. 7 is a sectional view of still a further embodiment of the patch package structure of the invention.

Fig. 8 is a slant view of a conventional patch package structure.

Fig. 9 is a slant view of another conventional patch package structure.

25

### **Description of the Reference Numerals and Signs**

100 patch package structure

- 101 patch
- 102 package
- 103 first sheet material
- 104 second sheet material
- 5 200 patch package structure
- 201 patch
- 202 package
- 203 first sheet material
- 204 second sheet material
- 10 205 sealed part
- 206 unsealed part
- 207 backing
- 208 pressure-sensitive adhesive layer
- 209 release liner
- 15 210 protrudent part
- 211 recessed part
- 212 rising angle
- 301 patch
- 307 backing
- 20 308 pressure-sensitive adhesive layer
- 309 release liner
- 400 patch package structure
- 401 patch
- 402 package
- 25 403 first sheet material
- 404 second sheet material
- 405 sealed part

406 unsealed part  
407 backing  
408 pressure-sensitive adhesive layer  
409 release liner  
5 410 protrudent part  
411 recessed part  
412 rising angle  
501 patch  
504 second sheet material  
10 507 backing  
509 release liner  
510 protrudent part  
511 recessed part  
514 cut line  
15 515 part corresponding to cut line 514  
601 patch  
604 second sheet material  
607 backing  
608 pressure-sensitive adhesive layer  
20 609 release liner  
611 recessed part  
612 recessed part  
615 part corresponding to cut line 614  
700 patch package structure  
25 701 patch  
702 package  
704 second sheet material

707 backing  
709 release liner  
710 protrudent part  
711 recessed part  
5 712 recessed part  
713 recessed part  
714 cut line  
1 patch  
3 backing  
10 9 slit  
10 package  
12 blister pack  
14 sheet-form cap  
16 pinching area  
15 18 central part  
22 outer part  
24 outer wall  
26 flange  
28 bottom  
20 8 patch  
10 sheet-form packaging material

#### **DETAILED DESCRIPTION OF THE INVENTION**

Representative embodiments of the invention will be explained below by  
25 reference to drawings. Each drawing is enlarged in the direction perpendicular to the  
sheet materials (top-and-bottom direction in the drawing) for the purpose of an easy  
explanation of the concept of the invention. Actual products can be produced in a

flatter form.

Fig. 1 is a slant view of a typical embodiment of the patch packing structure of the invention. This patch package structure 100 of the invention includes a patch a package 102 and a patch 101 disposed therein. The package 102 is constituted of a 5 first sheet material 103 which is planar and a second sheet material 104 which has been molded.

Fig. 2 is a sectional view diagrammatically illustrating the cross section of the package structure at the position indicated by X in Fig. 1. This package structure 200 is constituted of a patch 201 and a package 202. The package 202 has a sealed 10 part 205 formed by sealing a first sheet material 203 which is planar and a second sheet material which has been molded in peripheral parts thereof, as well as an unsealed part 206. The patch 201 is disposed in the package 202 constituted of the first sheet material 203 and the second sheet material 204. The package 202 may further contain other substances such as a material for deoxygenation, according to the necessity.

15 The patch 201 is constituted of a backing 207, a pressure-sensitive adhesive layer 208 formed on at least one side of the backing, and a release liner 209 which protects the pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer.

In the invention, the planar outer shape of the release liner may coincide with that of the pressure-sensitive adhesive layer and that of the backing, or may be larger than them.

20 In the embodiment shown in Fig. 2, the planar outer shape of the release liner 209 is larger than that of the pressure-sensitive adhesive layer 208. Namely, the edges of the release liner 209 at least partly have an area or region projecting from the edges of the pressure-sensitive adhesive layer 208. Such an area or region need not surround the 25 whole edges of the pressure-sensitive adhesive layer 208, and the edges of the release liner 209 may partly coincide with the edges of the pressure-sensitive adhesive layer 208.

Since this embodiment has the constitution described above, when the patch

201 moves in the package during the storage or transportation of the package structure 200, those parts in the patch 201 which may come into contact with the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204 are limited to peripheral parts of the release liner 209, and the peripheral parts of the 5 pressure-sensitive adhesive layer 208 of the patch 201 come into contact with neither the inner surface of the first sheet material 203 nor the inner surface of the second sheet material 204.

Explanations are then given in reference to Fig. 3. Fig. 3 is a slant view of a patch 301, which corresponds to the patch 101 shown in Fig. 1. This patch 301 10 includes a backing 307, a pressure-sensitive adhesive layer 308 formed on one side of the backing 307, and a release liner 309 attached to the surface of the pressure-sensitive adhesive layer 308 in order to protect the pressure-sensitive adhesive layer 308. The planar outer shape of the release liner 309 is larger than that of the pressure-sensitive adhesive layer 308. Unlike Fig. 1, Fig. 3 illustrates the patch, with the release liner 15 309 above and the backing 307 below for convenience.

In the embodiment shown in Fig. 3, the release liner 309 has a wavy cut line 314 so that the user can easily peel off the release liner 309 from the pressure-sensitive adhesive layer 308 at the time of application to the skin. In preparation for application, when the user slightly bends the patch 302 so as to form a ridge along the cut line 314, 20 areas suitable for pinching for peeling off the release liner 309 are easily obtained. It is therefore preferred to form such a cut line 314 in the release liner 309. The planar shape of the cut line may be a continuous line or a broken line, and the planar shape thereof is not limited to a wavy line and the examples thereof include a substantially straight line and a zigzag line. A wavy line or a zigzag line is preferred from the 25 standpoint of easily obtaining pinching areas for peeling off the release liner. The cut line need not be completely continuous, i.e., may be separated, and the cut line may have uncut areas so long as the uncut areas can be broken with fingers.

With reference to Fig. 2 again, the second sheet material 204 has a protrudent part 210. Attention is directed to one end of the package structure in the cross section of the package structure shown in Fig. 2. The first sheet material 203 begins at one end, extends substantially linearly, and ends at the other end. The 5 second sheet material 204 begins at or near one end, forms a cross section having a given shape, and ends at or near the other end.

With respect to the given shape in the embodiment shown in Fig. 2, the second sheet material 204 extends from one end to the other end. In this embodiment, the second sheet material 204 begins at one end, extends substantially linearly from this 10 end almost parallel with the first sheet material 203 to form a sealed part 205, and reaches a rising part. The term "rising part" herein means a part where the second sheet material 204 shifts from the sealed part 205 to the unsealed part 206. At the rising part, the second sheet material 204 has a given rising angle 212.

After passing through this rising part, the second sheet material 204 begins 15 to get away from the first sheet material 203 and begins to approach again the first sheet material 203 at a first part. At this first part, the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204 provide a first distance. Subsequently, the second sheet material 204 which has begun to approach the first sheet material 203 begins to get away again from the first sheet material 203 at a second part. 20 At this second part, the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204 provide a second distance. Subsequently, the second sheet material 204 which has begun to get away from the first sheet material 203 begins to approach again the first sheet material 203 at a third part. At this third part, the inner surface of the first sheet material 203 and the inner surface of the second sheet 25 material 204 provides a third distance.

Subsequently, the second sheet material 204 which has begun to approach the first sheet material 203 reaches another rising part, extends again substantially

linearly and almost parallel with the first sheet material 203 to form another sealed part, and ends at the other end.

In the embodiment shown in Fig. 2, the larger of the first distance and the third distance indicates a maximum gap distance  $D$  between the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204. The first distance may be the same as third distance; in this case, the maximum gap distance  $D$  is equal to the first distance and also to the third distance. On the other hand, the second distance indicates a minimum gap distance  $d$  between the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204.

In the invention, the region ranging from one rising part to another rising part is referred to as a protrudent part, which is denoted by 210 in Fig. 2. On the other hand, the region ranging from the part providing the first distance to the part providing the third distance is referred to as a recessed part, which is denoted by 211 in Fig. 2. In this embodiment, the recessed part 211 is disposed in a substantially central part of the protrudent part 210 from the standpoints of ease of molding, shape stability, and the like.

There are cases where the protrudent part 210 is constituted of flat surfaces as in embodiments which will be described later. However, package structures in which the protrudent part 210 includes curved surfaces as in the embodiment shown in Fig. 2 have a high thickness-direction strength. Furthermore, when the protrudent part 210 is constituted of curved surfaces, molding is easy. Additionally, since the package structure can have a relatively small internal volume, the stability of the patch becomes high.

In the embodiment shown in Fig. 2, the bottom of the recessed part 211 is substantially flat. Although such a bottom may be either substantially flat or curved in the invention, it is preferred that the bottom be substantially flat from the standpoint of reducing the load per unit area to be imposed on the region which may come into

contact with the patch.

Since this recessed part 211 functions so as to support the patch 201, and the inner surface of the protrudent part 210 of the second sheet material 204 is kept apart from peripheral parts of the pressure-sensitive adhesive layer 208 of the patch 201, the 5 peripheral parts of the pressure-sensitive adhesive layer are less apt to come into contact with the inner surface of the second sheet material.

Furthermore, in the recessed part 211 of the second sheet material 204 in Fig. 2, the minimum gap distance  $d$  between the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204 is not smaller than the 10 thickness  $T$  of the patch 201, and is preferably larger than  $T$ . Accordingly, a load is less apt to be imposed on the patch 201 in the thickness direction therefor, and therefore, components of the pressure-sensitive adhesive layer are inhibited from protruding from peripheral parts of the pressure-sensitive adhesive layer 208 of the patch 201. This is effective especially in the patch 302 in which the release liner 309 has a cut line 15 314 as in the case explained above by reference to Fig. 3, because the components of the pressure-sensitive adhesive layer are inhibited from protruding from the cut line 314 upon reception of such a load. In specific examples,  $T$  is 0.2-0.3 mm and  $d$  is 0.5-2.0 mm.

As shown in fig. 2, the second sheet material 204 has the rising parts. The 20 rising angle 212 in each rising part is an obtuse angle, i.e., larger than 90 degrees and smaller than 180 degrees.

In a case where the rising angle 212 is 90 degrees or smaller, this package structure as a whole becomes thick. Furthermore, such a package structure has a drawback that when it is opened by cutting from the sealed part 205 to the unsealed part 25 206 with scissors, a lot of power is necessary and the package structure cannot be smoothly opened. In a case where the rising angle 212 is 180 degrees, this means that the package structure has no rising part, and therefore, there is a possibility that

peripheral parts of the pressure-sensitive adhesive layer 208 of the patch might come into contact with the second sheet material 204.

The rising angle 212 herein means the angle formed, at the boundary between the sealed part 205 where the first and second sheet materials are sealed together and the unsealed part 206, by the outer surface of the second sheet material 204 in the sealed part 205 and the outer surface of the second sheet material 204 in the unsealed part 206. These outer surfaces may be flat or curved. In the case where the outer surface of the second sheet material 204 in the unsealed part 206 is curved as shown in Fig. 2, the rising angle 212 means the angle formed by a flat plane circumscribed about the unsealed part 206 at the boundary and the outer surface of the second sheet material 204 in the sealed part 205. This can be applied in the case where the sealed part 205 is curved.

The rising angle 212 is preferably 95-175 degrees, more preferably 100-170 degrees, even more preferably 110-165 degrees, and most preferably 115-160 degrees.

By employing such a rising angle 212, the package structure 200 as a whole can be made thin and such a thin package structure is advantageous from the standpoints of the cost of package structure production and the cost of handling of packaged products such as transportation thereof. Furthermore, such a thin package structure can be easily opened with scissors or the like.

The maximum gap distance D between the package inner surface of the protrudent part 210 of the second sheet material 204 and the package inner surface of the first sheet material 203, as shown in Fig. 2, is not particularly limited. However, it is preferred that D be smaller than 2.6d in order to make the package structure 200 as a whole thin to thereby reduce the volume thereof. Symbol d is the minimum gap distance between the inner surface of the first sheet material 203 and the inner surface of the second sheet material 204 in the recessed part of the second sheet material 204. D is more preferably smaller than 2.3d, even more preferably smaller than 2.0d,

especially preferably smaller than  $1.7d$ , and most preferably smaller than  $1.5d$ .

Incidentally,  $D$  is inevitably larger than  $d$  because the recessed part 211 is located in the protrudent part 210.

The planar outer shape of the patch, that of the package structure, and that 5 of the protrudent part are not particularly limited. Examples thereof include substantially polygonal shapes, such as substantially rectangular shapes, substantially elliptic shapes, and substantially circular shapes. From the standpoint of diminishing defects in the sheet materials, etc., substantially rectangular shapes such as that shown in Fig. 1 are preferred. From the standpoint of packaging efficiency, it is preferred that 10 the planar outer shapes thereof should be substantially similar to each other.

In a specific example of the embodiment shown in Fig. 2, the backing 207 and pressure-sensitive adhesive layer 208 of the patch 201 each have a substantially rectangular planar outer shape in which one side has a length of 20-100 mm and another side has a length of 20-100 mm, and the release liner 209 has a substantially rectangular 15 planar outer shape in which one side has a length of 22-104 mm and another side has a length of 22-104 mm. The release liner 209 of this example hence has a strip-shaped projecting peripheral area having a width of 1-2 mm.

In order to have peripheral parts of the pressure-sensitive adhesive layer of the patch to be sufficiently apart from the inner surface of the second sheet material, the 20 planar outer shape of the protrudent part is preferably larger than that of the release liner of the patch. From the same standpoint, the planar outer shape of the bottom of the recessed part is preferably smaller than that of the pressure-sensitive adhesive layer.

In a specific example of the embodiment shown in Fig. 2, the protrudent part 210 has a substantially rectangular planar outer shape in which one side has a 25 length of 30-110 mm and another side has a length of 30-110 mm; the recessed part 211 has a substantially rectangular planar outer shape in which one side has a length of 20-100 mm and another side has a length of 20-100 mm; and the bottom of the recessed

part 211 has a substantially rectangular outer shape in which one side has a length of 10-90 mm and another side has a length of 10-90 mm. By employing such a shape, the peripheral parts of the pressure-sensitive adhesive layer 208 can be sufficiently apart from the inner surface of the second sheet material 204, whereby the components of the pressure-sensitive adhesive layer are less apt to adhere to the inner surfaces of the package 202.

The first sheet material and second sheet material in the patch package structure of the invention described above are not particularly limited so long as both materials can be sealed together for forming the package. Heat-sealable sheet materials are preferred from the standpoint of ease of production. Examples of such packaging materials include films of resins such as polyolefins including polyethylene and polypropylene, polyesters including poly(ethylene terephthalate), and other resins including poly(vinyl chloride) and polyacrylonitrile, metal films such as aluminum foils, materials obtained by vapor-depositing aluminum on these films, and laminated films obtained by laminating two or more thereof.

From the standpoints of impermeability to package contents such as a drug and heat sealability, a polyacrylonitrile film or the like is preferred for use as such a packaging material. From the standpoint of non-adsorptive property of package contents such as a drug, it is preferred to employ a polyester, especially poly(ethylene terephthalate) or the like. From the standpoint of impermeability to package contents, light rays or gases, more preferred packaging materials are those resin films which have undergone aluminum vapor deposition and laminated films obtained by laminating an aluminum foil to those resin films. More preferred from the standpoint of combining those properties are laminated films obtained by laminating polyesters, in particular poly(ethylene terephthalate) and a polyacrylonitrile film. Most preferred is a laminated film obtained by laminating polyesters, in particular poly(ethylene terephthalate), an aluminum foil or vapor-deposited aluminum layer, and a

polyacrylonitrile film. From the standpoint of the storage stability of package contents such as a drug, a laminated film obtained by laminating a water-impermeable layer to the outer side of a hygroscopic layer containing a drying agent and a water-permeable layer respectively is also preferred.

5           Materials and constitutions of the first sheet material and the second sheet material may be the same or different. The first sheet material is preferably made of a flexible material because such sheet material can be easily sealed with the second sheet material to thereby facilitate production. The second sheet material is preferably made of a rigid material because it is molded into a given shape.

10          The invention can be especially advantageously practiced when a laminated film is employed, in particular when the second sheet material includes an aluminum foil or vapor-deposited aluminum layer. This is because due to the given rising angle, the laminate during molding is less apt to break or to undergo the breakage of the aluminum foil or vapor-deposited aluminum layer.

15          The thickness of the first sheet material is not particularly limited. However, it is preferably 10-200  $\mu\text{m}$ , and more preferably 20-100  $\mu\text{m}$ , from the standpoints of production efficiency and impermeability to components to be packaged in the package structure.

20          The thickness of the second sheet material is not particularly limited. It is, however, preferred that the second sheet material have some degree of stiffness because of the necessity of molding into the given shape. From this standpoint, the thickness thereof is preferably 50-300  $\mu\text{m}$ , and more preferably 50-200  $\mu\text{m}$ .

25          Methods for molding the second sheet material into the given shape are not limited. Examples thereof include vacuum/pressure forming, injection molding, and press molding. From the standpoints of suitability for cost reduction, degree of freedom of shapes, material selection, etc., vacuum forming, pressure forming, and the like are preferred.

As described above, the patch included in the patch package structure of the invention is constituted of a backing, a pressure-sensitive adhesive layer formed on at least one side of the backing, and a release liner which protects the pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer. The outer shape of the 5 release liner is not particularly limited so long as it is larger than the outer shape of the pressure-sensitive adhesive layer.

The patch may be an adhesive preparation in which the pressure-sensitive adhesive layer contains a drug. The drug herein is not particularly limited. Preferred is a drug which can be administered to a mammal such as a human being through the 10 skin, i.e., which is percutaneously absorbable. Examples of such drugs include systemic anesthetics, hypnotic agents, antiepileptics, antipyretic/analgesic/antiphlogistic agents, antidizzing agents, psychoneurotics, local anesthetics, skeletal muscle relaxants, agents for autonomous nerve, antispasmodics, anti-Parkinsonian agents, antihistamines, cardiotonics, antiarrhythmics, diuretics, antihypertensives, vasoconstrictors, coronary 15 vasodilators, peripheral vasodilators, antiarteriosclerotic agents, agents for circulatory organs, respiration facilitators, antitussive/expectorant agents, hormone drugs, external-use preparations for purulent diseases, analgesic/antipruritic/astringent/antiphlogistic agents, agents for parasitic skin diseases, hemostats, antipodagrics, agents for diabetes, antineoplastics, antibiotics, chemotherapeutics, narcotics, and smoking renunciation 20 aids.

The content of the percutaneously absorbable drug is not particularly limited so long as it sufficiently produces the effect thereof and does not impair the adhesiveness of the pressure-sensitive adhesive. However, the content thereof in the pressure-sensitive adhesive is preferably 0.1-60% by weight, and more preferably 0.5-25 40% by weight. In the case where the content thereof is lower than 0.1% by weight, there is a possibility that the remedial effect might be insufficient. In the case where the content thereof is higher than 60% by weight, there is a possibility that skin

irritation might occur and such a large drug amount might be economically disadvantageous.

The pressure-sensitive adhesive is not particularly limited. Examples thereof include acrylic pressure-sensitive adhesives containing an acrylic polymer; 5 rubber-based pressure-sensitive adhesives such as styrene/diene/styrene block copolymers (e.g., styrene/isoprene/styrene block copolymers and styrene/butadiene/styrene block copolymers), polyisoprene, polyisobutylene, and polybutadiene; silicone type pressure-sensitive adhesives such as silicone rubbers, dimethylsiloxane-based polymers, and diphenylsiloxane-based polymers; vinyl ether 10 type pressure-sensitive adhesives such as poly(vinyl methyl ether), poly(vinyl ethyl ether), and poly(vinyl isobutyl ether); vinyl ester type pressure-sensitive adhesives such as vinyl acetate/ethylene copolymers; and polyester type pressure-sensitive adhesives produced from a carboxylic acid component such as dimethyl terephthalate, dimethyl isophthalate, or dimethyl phthalate, and a polyhydric alcohol component such as 15 ethylene glycol.

Acrylic pressure-sensitive adhesives or rubber-based pressure-sensitive adhesives are preferred among such pressure-sensitive adhesives because acrylic or rubber-based pressure-sensitive adhesives give a pressure-sensitive adhesive layer which is capable of holding a liquid component therein and hence can give a soft feeling 20 during wear on the skin. In particular, acrylic pressure-sensitive adhesives are preferred because they can be easily crosslinked and give a pressure-sensitive adhesive layer capable of holding a large amount of a liquid component therein.

Examples of such acrylic pressure-sensitive adhesives include acrylic ester type pressure-sensitive adhesives containing as the main component a polymer 25 comprising monomer units derived from one or more C<sub>2-18</sub> alkyl esters of (meth)acrylic acid. Examples of those rubber-based pressure-sensitive adhesives include rubber-based pressure-sensitive adhesives containing as the main component at least one

member selected from polyisobutylene, polyisoprene, and styrene/diene/styrene copolymers.

The liquid component is not particularly limited. From the standpoint of compatibility with the pressure-sensitive adhesive layer, organic liquid components are 5 preferred. Although the organic liquid components are not particularly limited, ones having the effect of accelerating percutaneous absorption are preferred. Examples of such organic liquid components include glycols such as ethylene glycol, diethylene glycol, propylene glycol, triethylene glycol, polyethylene glycol, and polypropylene glycol; fats and oils such as olive oil, caster oil, squalane, and lanolin; hydrocarbons 10 such as liquid paraffin; various surfactants; ethoxy stearyl alcohol; glycerol monoesters such as oleic acid monoglyceride, caprylic acid monoglyceride, and lauric acid monoglyceride, glycerol diesters, glycerol triesters, and mixtures thereof; alkyl esters of fatty acids, such as ethyl laurate, isopropyl myristate, isotridecyl myristate, octyl 15 palmitate, isopropyl palmitate, ethyl oleate, and diisopropyl adipate; higher fatty acids such as oleic acid and caprylic acid; and other compounds including N-methylpyrrolidone and 1,3-butanediol.

In the case that a liquid component is contained in the pressure-sensitive adhesive layer, there is a possibility that components of the pressure-sensitive adhesive layer might protrude, during storage of the patch, from peripheral parts of the pressure-sensitive adhesive layer or from the cut line optionally formed in the release liner. The 20 invention is advantageously practiced especially in such cases. From this standpoint, the content of the liquid component in the pressure-sensitive adhesive layer is preferably 5-70% by weight, more preferably 10-65% by weight, and most preferably 15-60% by weight.

25 When the pressure-sensitive adhesive layer is relatively thick, the thickness of this pressure-sensitive adhesive layer is preferably 20-300  $\mu\text{m}$ , more preferably 30-250  $\mu\text{m}$ , and most preferably 50-200  $\mu\text{m}$ .

Preferred alternative embodiments of the invention are explained below by reference to other drawings. In these embodiments, the constitutions are the same as those of the embodiment shown in Figs. 1 and 2, unless otherwise indicated.

Fig. 4 shows an embodiment in which the second sheet material has a shape 5 having substantially flat surfaces. In this embodiment, the second sheet material 404 has a region in which it is almost linear and substantially parallel with the inner surface of the first sheet material 403, in each of a first part where the second sheet material 404 has a first distance from the inner surface of the first sheet material 403 and a third part where the second sheet material 404 has a third distance from the inner surface of the 10 first sheet material 403, as defined above by reference to Fig. 2. In this embodiment, the region ranging from the point in the part where the inner surface of the second sheet material 404 provides the first distance from the inner surface of the first sheet material 403 which is closest to the center of the package structure 400 to the point in the part where the inner surface of the second sheet material 404 provides the third distance 15 from the inner surface of the first sheet material 403 which is closest to the center of the package structure 400 is referred to as a recessed part, which is denoted by 411 in Fig. 4.

As shown in the package-structure sectional view in Fig. 4, the second sheet material 404 in this embodiment passes through a rising part and then extends substantially linearly to the first part. In this package structure embodiment, the outer 20 surface of the second sheet material 404 at each boundary between the sealed part 405 and the unsealed part 406 in Fig. 4 may have a large rising angle 412 in comparison with the package structure of the type shown in Fig. 2 which has the same volume. Consequently, this package structure can be smoothly opened with scissors.

Fig. 5 is a diagrammatic sectional view of an embodiment in which the 25 protrudent part 510 of the second sheet material 504 has a recessed part 511 in such a position that the recessed part 511 does not come into contact with the backing 507 of that part 515 which corresponds to the cut line 514 of the release liner 509. Since the

recessed part 511 is disposed in such a position, a load is inhibited from being imposed in the thickness direction for the patch 501 on the part 515 corresponding to the cut line 514 formed in the release liner 509 of the patch 501 even when the second sheet material 504 deforms slightly. Consequently, components of the pressure-sensitive adhesive layer are inhibited from protruding from the cut line 514.

Fig. 6 is a diagrammatic sectional view of an embodiment in which the protrudent part of the second sheet material 604 has two or more recessed parts, i.e., a recessed part 611 and a recessed part 612 in this case. By thus forming two or more recessed parts, the load to be imposed on the patch 601 in the thickness direction therefor can be dispersed to thereby reduce such load per unit area. Consequently, components of the pressure-sensitive adhesive layer can be inhibited from protruding from peripheral and other parts of the pressure-sensitive adhesive layer 608. Furthermore, as shown in Fig. 6, the recessed part 611 and the recessed part 612 have been formed in such positions that they do not come into contact with that part 615 of the backing 607 of the patch 601 which corresponds to the cut line 614 of the release liner 609. Because of this, a load is inhibited from being imposed in the thickness direction for the patch 601 on the part 615 corresponding to the cut line 614 formed in the release liner 609 of the patch 601. Consequently, components of the pressure-sensitive adhesive layer are inhibited from protruding from the cut line 614.

Fig. 7 is a diagrammatic sectional view of an embodiment in which the protrudent part 710 of the second sheet material 704 has three recessed parts 711, 712, and 713. By forming a lot of recessed parts as in this embodiment, the outer shape per recessed part can be smaller. Consequently, the package 702 can have enhanced rigidity.

While the present invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to one skilled in the art that various

changes and modifications can be made therein without departing from the scope thereof.

This application is based on Japanese patent application No. 2007-003313 filed January 11, 2007.

**WHAT IS CLAIMED IS:**

1. A patch package structure, which comprises:
  - a package comprising a first sheet material which is planar and a second sheet material which has been molded, said first and second sheet materials being sealed together in peripheral parts thereof; and
    - a patch disposed in the package,
      - wherein the patch comprises a backing, a pressure-sensitive adhesive layer laminated on at least one side of the backing, and a release liner which protects a pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer,
        - wherein the second sheet material has been molded so as to have a protrudent part in at least a substantially central area thereof, said protrudent part having a planar outer shape larger than a planar outer shape of the release liner and having at least one recessed part,
          - wherein  $d$  is not smaller than  $T$ , in which  $d$  is the minimum gap distance between the inner surface of the first sheet material and the inner surface of the second sheet material at the recessed part and  $T$  is a thickness of the patch, and
            - wherein, at the boundary between the sealed part where the first and second sheet materials are sealed together and an unsealed part, the outer surface of the second sheet material rises at an obtuse angle.
  2. The package structure according to claim 1, wherein the release liner of the patch has a planar outer shape larger than a planar outer shape of the pressure-sensitive adhesive layer.
  3. The package structure according to claim 1,
    - wherein the patch is disposed in the package in such a way that the release

liner faces the inner surface of the first sheet material,  
wherein the release liner has a cut line, and  
wherein the recessed part of the second sheet material is positioned in such a  
way that the recessed part does not come into contact with a part of the backing which  
corresponds to the cut line.

4. The package structure according to claim 1, wherein the  
protrudent part has two or more recessed parts.
5. The package structure according to claim 1, wherein the  
pressure-sensitive adhesive layer contains a liquid component.
6. The package structure according to claim 1, wherein the patch  
is an adhesive preparation comprising a pressure-sensitive adhesive layer containing a  
drug.

1/5

FIG. 1

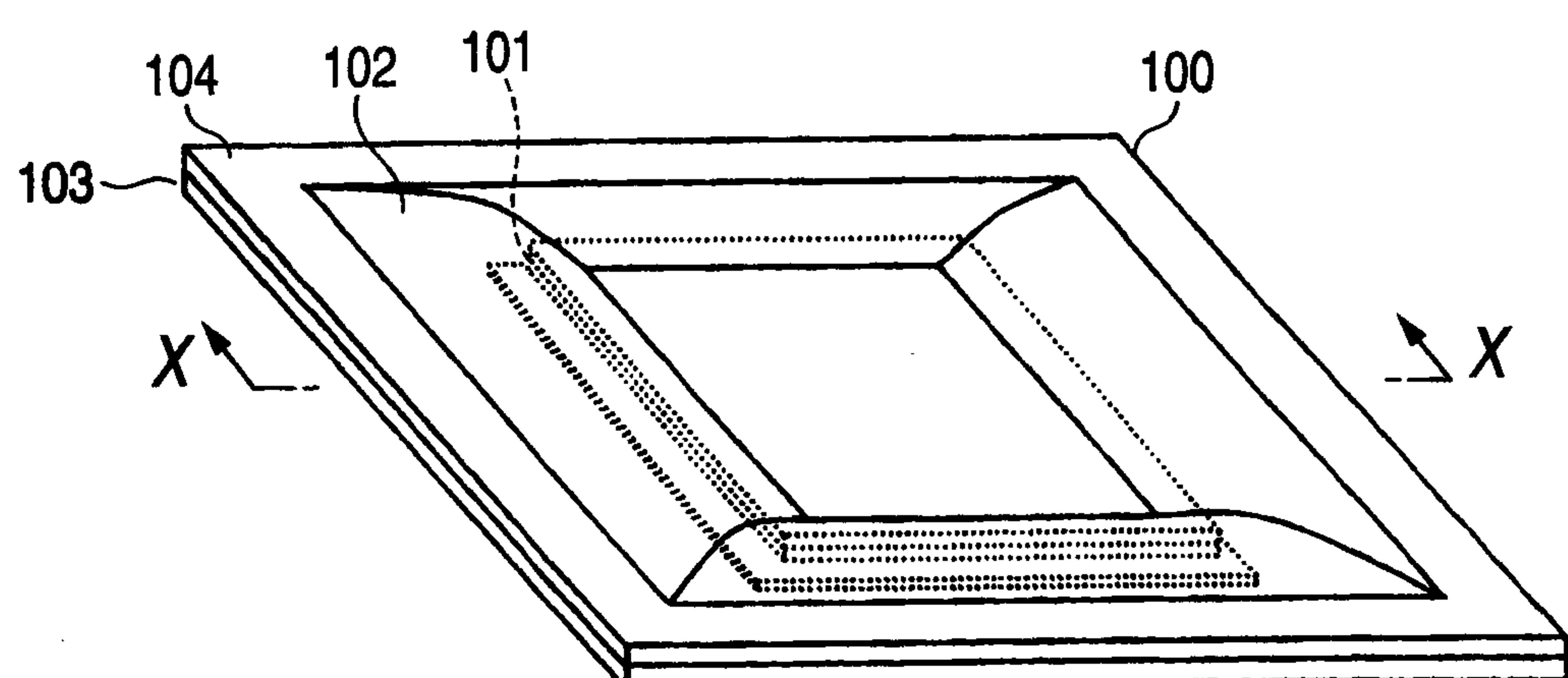
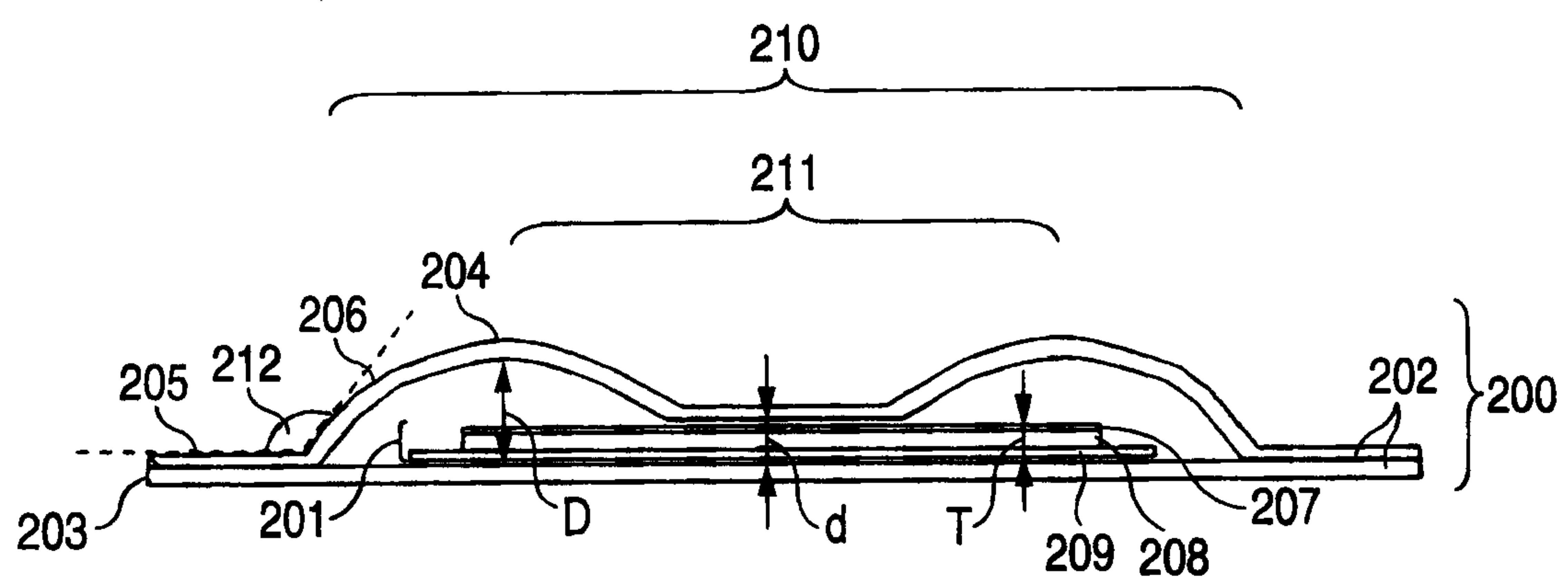


FIG. 2



2/5

FIG. 3

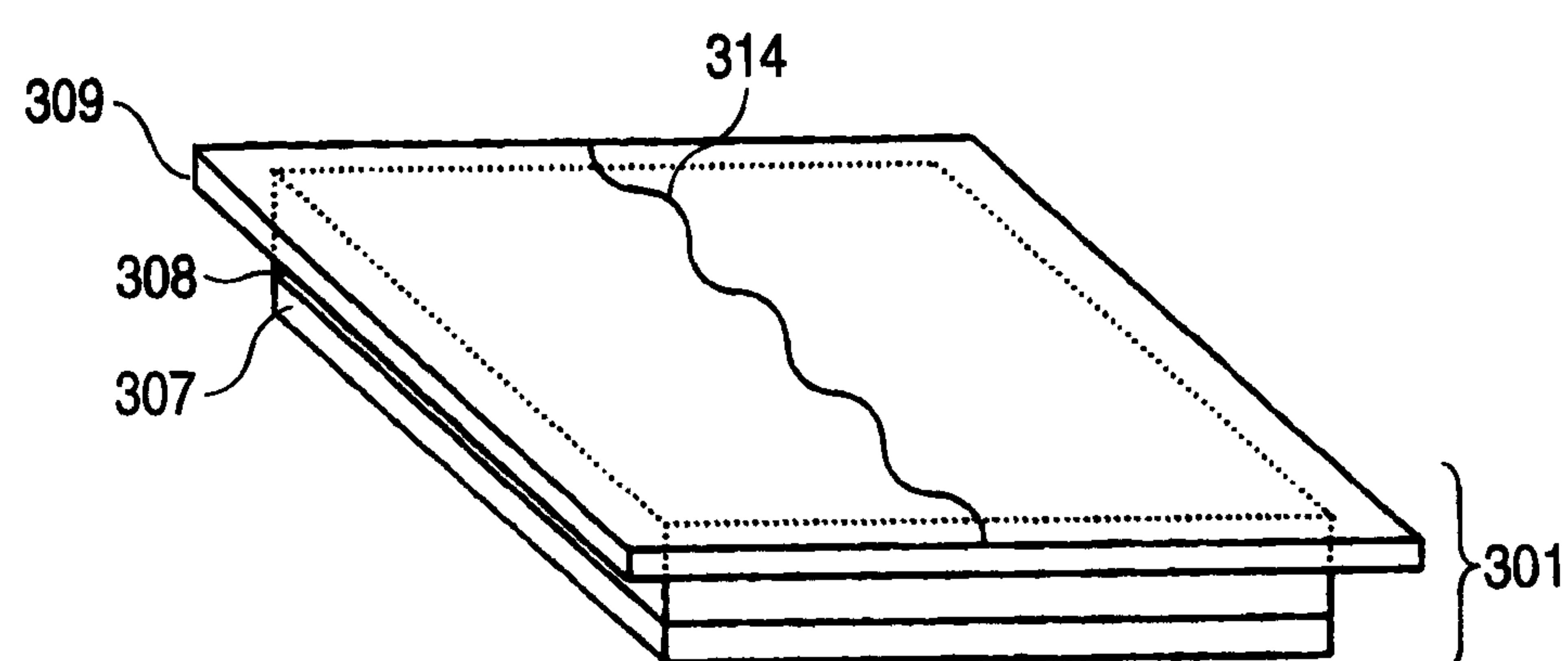
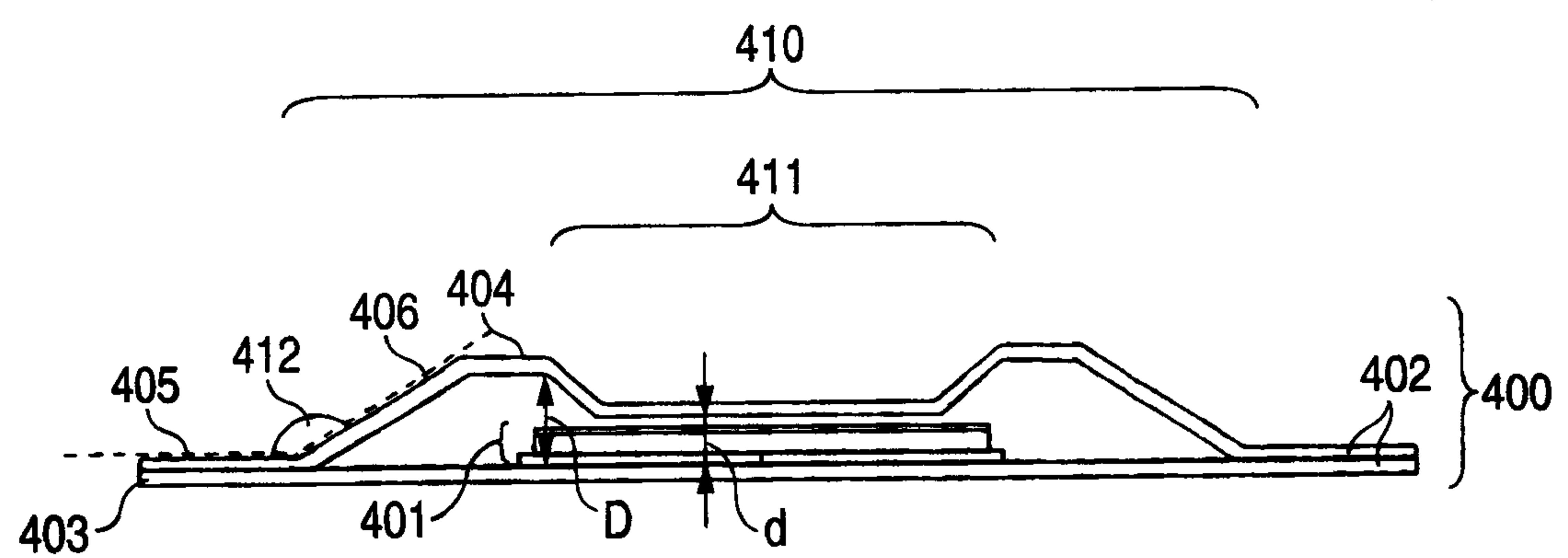


FIG. 4



3/5

FIG. 5

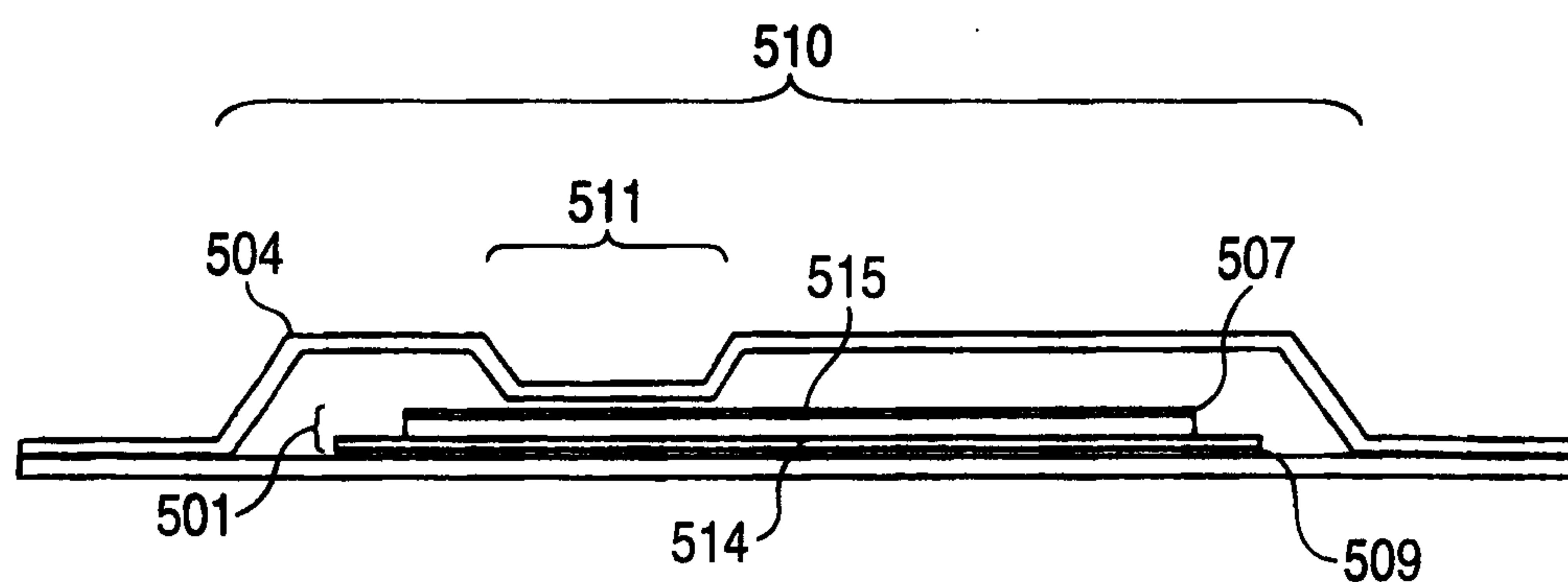


FIG. 6

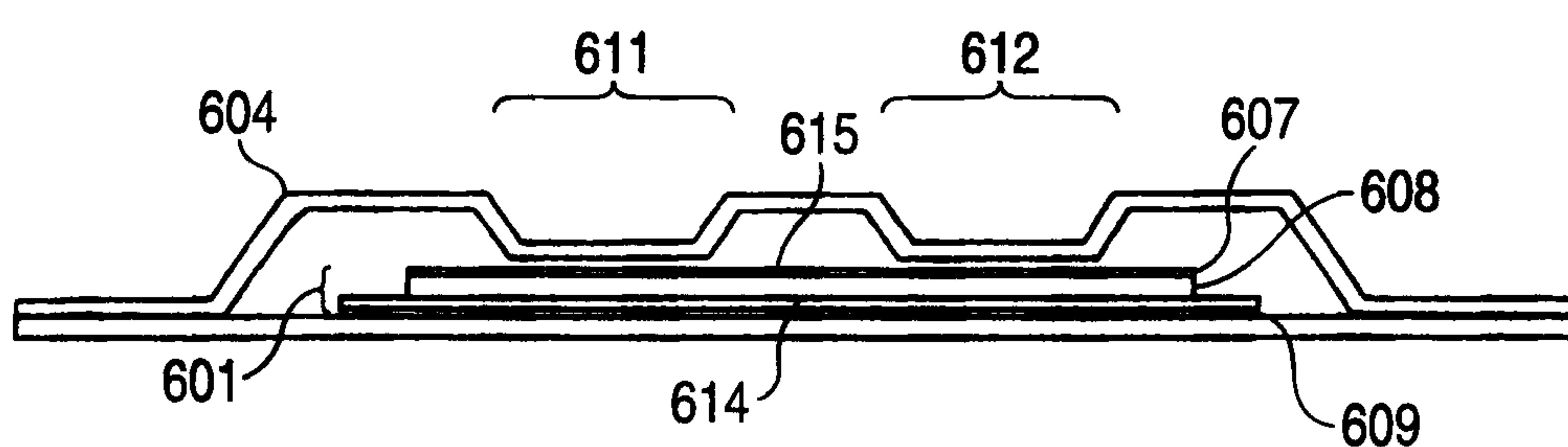
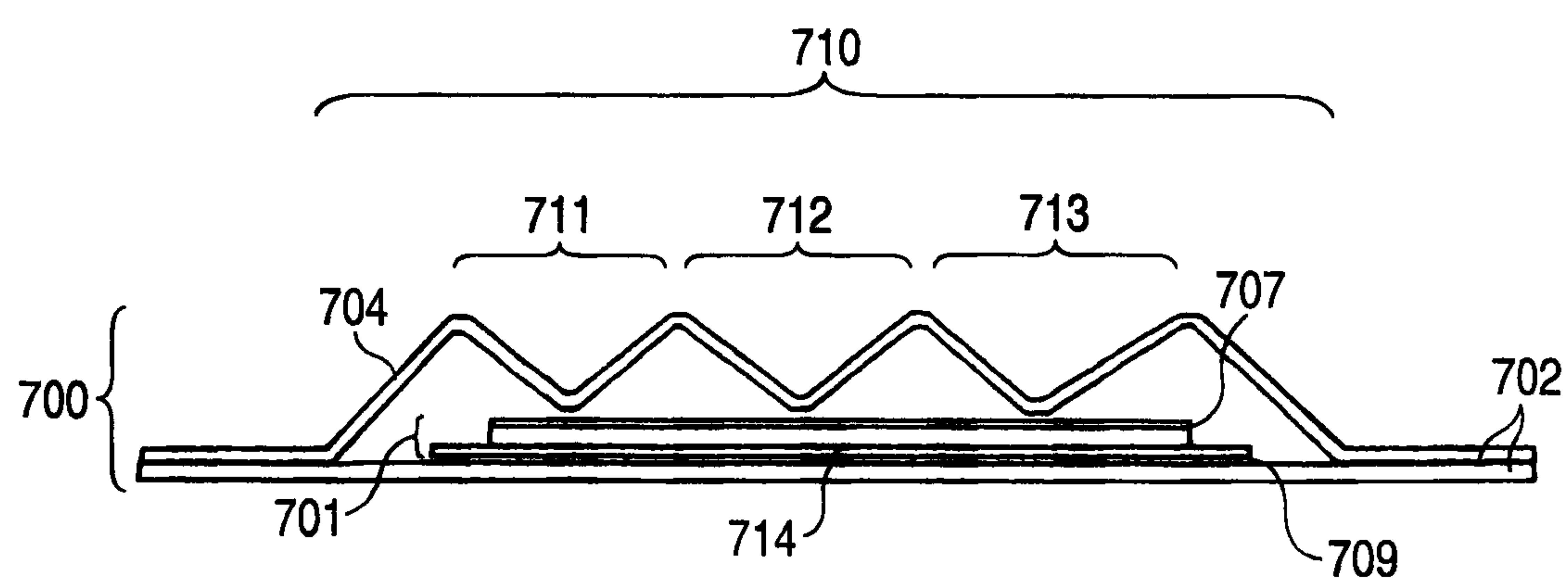


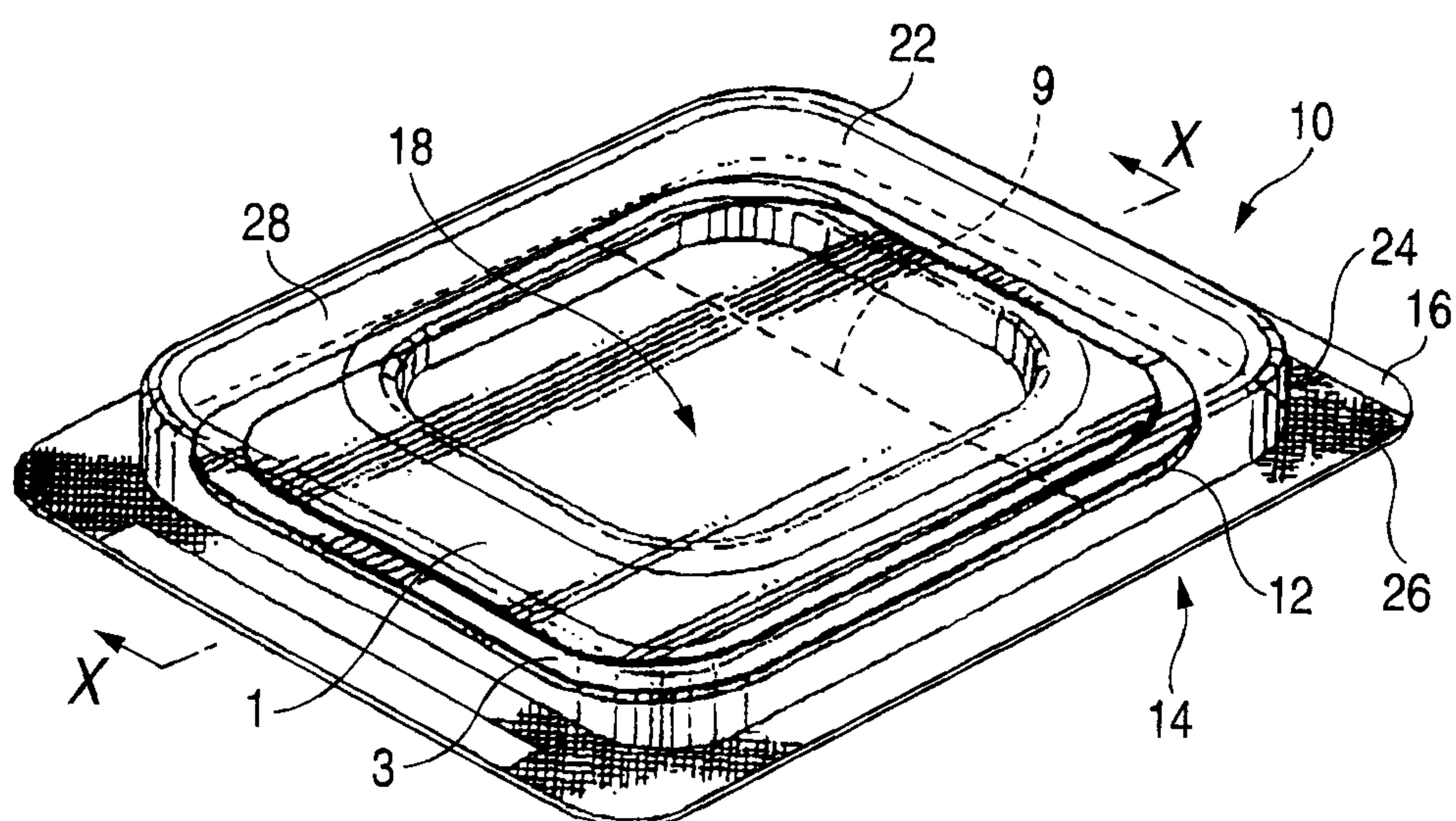
FIG. 7



4/5

*FIG. 8*

Prior Art



5/5

*FIG. 9*

Prior Art

