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(54) **Tamper evident band for a food container**

(57) An easy to open tamper evident band (20) for a food container (10) and, in particular, an easy to open tamper evident band with a pull tab (22) extending past a seam (24) and a perforation (26) on the band for a frozen food container. The band withstands freezing storage temperatures and minimizes breakage of the band during freezing, storage, and transportation conditions

while providing an easy way to open the band. The band is placed around the perimeter of the container and two end portions are sealed together at a seam (24), where one end portion extends past the seam and the other end portion to form a flap or pull-tab (22). The band also contains a perforation (26) located between the seam and an end portion.

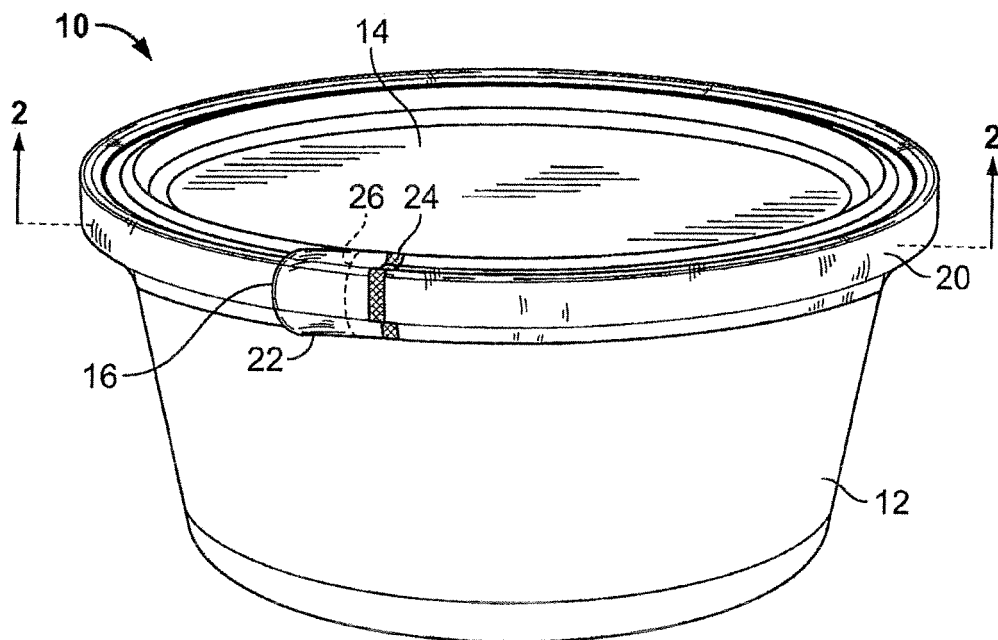


FIG. 1

Description**FIELD**

- 5 **[0001]** An easy to open, tamper evident band for a food container and, in particular, an easy to open, tamper evident band with a pull tab.

BACKGROUND

- 10 **[0002]** Food containers are often packaged with some type of tamper evident seal or band. These bands can also aid in keeping the container together prior to a consumer purchasing the product. One common tamper evident seal is to use a band or plastic strip that is wrapped around the outer rim of a container. The tamper evident band is wrapped around the edge of the container lid and an upper portion of the container base. The band is held together by a seam that is typically placed between an inner surface edge of an outer layer and an inner layer, forming a continuous band
15 around the container rim such that the lid and base cannot be separated without first removing the tamper evident band or breaking its seal around the container rim. This feature of the band provides the visual indication necessary to show if the product has been tampered with and already opened.

- [0003]** One drawback of using the tamper evident band is that it can prove difficult for the consumer to open. The overlapping ends of the tamper evident band are often sealed together at a seam such that the band forms one continuous ring or band around the container rim, without any flap or loose end to grab. In order for the consumer to open the band, the consumer must try to break through the band, either by hand or with the aid of an instrument that can cut through the band or rip through it.

- [0004]** As a result, some tamper evident bands have been manufactured with features to aid in the removal of the bands. One such feature is placing a perforation through the band so it spans from a top edge to a bottom edge, to
25 provide an easy tear point. One problem with perforations, however, has been that the perforation can be difficult to separate easily since the consumer may attempt to grasp a section of the band adjacent to the perforation and try to begin tearing through the perforation.

- [0005]** Another problem with the typical perforated band is that it has a high breakage rate during storage and transportation conditions. The perforated band also has problems withstanding freezing temperatures during storage, such
30 as temperatures as low as about -5°F. The freezing temperatures can affect the durability of the perforation and often the typical perforated band can begin to separate at these colder temperatures and to break apart along the perforation. Thus, the typical perforated band does not stand up well under these cold conditions and the integrity of the tamper evident band can be compromised.

- [0006]** A number of other variations of the single perforation band have also been tried, but have had similar problems. For example, double perforations or a tear tape with a perforation have been used but also with the high breakage rates associated with the single perforation band. Another design consists of a seam with a small notch spaced from the seam; however, this design also can have a large breakage rate and can also prove to be difficult to open.

- [0007]** The integrity of most tamper evident bands does not hold up well to low temperatures and does not often hold up to storage and transportation conditions. While the containers are being shipped they often bounce around in the
40 cartons or crates that they are packaged in, as well as within the vehicle used for transportation. During the movements endured during transport, the tamper evident bands can break.

SUMMARY

- 45 **[0008]** A tamper evident band for a food container is provided that minimizes or avoids breakage of the band during transportation and storage at freezing temperatures and provides a pull tab extending past the seam for an easy to open feature. A strip of a tamper evident band is placed around a rim of the food container where two end portions are sealed together at a seam. One of the end portions overlaps the other to extend past this seam and functions as a pull tab for an easy to open feature. The pull tab may provide extra material which covers and protects the seam, and a perforation,
50 if used, to protect it from breakage and to help the band remain intact. The pull tab extending past the seam is configured to withstand freezing storage temperatures and minimize or avoid breakage of the band during freezing and transportation, while providing an easy way to open the band.

- [0009]** The pull tab may have a free-standing end or the end may be temporarily held in place by an adhesive, which can be easily overcome to lift up the pull-tab and pull to separate the band. The band may also include a perforation adjacent the seam to aid in opening. The perforation may be attached to the outer layer of the band by a light adhesive.
55 The overlapping end of the pull tab can further protect the perforation by covering it and making it less susceptible to breakage.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0010] FIG. 1 is a perspective view of a container with a tamper evident band;
 [0011] FIG. 2 is a partial cross-sectional view of the container with the tamper evident band taken along line 2-2 of FIG. 1;
 [0012] FIG. 3 is an elevation view of a portion of the tamper evident band of FIG. 1 ;
 [0013] FIG. 4A is an elevation view of a portion of a prior art tamper evident band;
 [0014] FIG. 4B is an elevation view of a portion of another prior art tamper evident band;
 [0015] FIG. 4C is an elevation view of a portion of another prior art tamper evident band;
 [0016] FIG. 4D is an elevation view of a portion of another prior art tamper evident band;
 [0017] FIG. 4E is an elevation view of a portion of another prior art tamper evident band; and
 [0018] FIG. 4F is an elevation view of a portion of another prior art tamper evident band.

DETAILED DESCRIPTION

[0019] An easy open tamper evident band for a food container and, in particular, an easy open tamper evident band for a frozen food container having a pull tab used to aid in opening, is disclosed herein and illustrated in FIGS. 1-4. In particular, the pull tab extends past a seam that seals the band to itself and keeps the band in place about a rim of a container. The band, seam and the pull tab can withstand freezing temperatures, movements associated with transportation and storage conditions to minimize breakage of the band.

[0020] Turning to FIG. 1, a food container 10 is shown having an easy-open tamper evident band 20 around its rim. The food container 10 has a lid 14 and a base 12 for containing a food product therein. The band 20 can fit around an edge of the lid 14 and part of an upper section of the base 12. The band 20 is sealed about the lid 14 and the base 12 such that the lid 14 cannot be removed unless the band 20 is first removed or torn off. The band 20 has a first end portion 16 and a second end portion 18, such that when the band 20 is wrapped around the rim of the container 10 the first end portion 16 can become the outer end and the second end portion 18 can become the inner end, as shown in FIG. 2.

[0021] The overlapping portions of the first and second end portions of the band 20 are sealed at a seam 24 to form a ring around a perimeter of the container 10. The band 20 can be shrink-wrapped around the container 10. The seam 24 can be positioned at an edge portion of the inner end portion 18 and spaced from the outer end portion 16, thus creating a free flap or pull tab 22, as shown in FIG. 2. The seam 24 may be sized sufficient to join the end portions 16 and 18, but preferably spans the entire height of the band 20, from an upper edge adjacent the lid 14 to a lower edge adjacent the base 12. The seam 24 may also be generally linear, but other shapes may be used. The tab 22 overlaps the inner end 18 and extends past the seam 24. The outer end portion 16 of the band 20 becomes part of the pull tab 22 that can be grasped and pulled to easily break the seal of the band 20 at or near the area of the seam 24 to remove the band 20.

[0022] The pull tab 22 can be a free-standing pull-tab, as illustrated in FIG. 2, or it can be held in place temporarily against the inner portion 20a of the band 20 by a light adhesive. If the tab 22 is in place a light tack glue can be used, typically at or near the edge portion of the outer end 16 so that as little of a surface area of the tab 22 as possible is tacked down to the inner portion 20a of the band 20. Alternatively, the entire tab 22 or any portion of it can be tacked down to the inner portion 20a of the band 20, as long as it remains easy to lift up. The light tack glue can help to keep the tab 22 in place until the band 20 is to be removed and to prevent the tab 22 from catching on anything prior to opening.

[0023] The band 20 may further include a perforation 26 adjacent the seam 24 to further aid in removing and tearing the band 20. The perforation 26 is preferably located between the seam 24 and the outer end portion 16, and may be located closer to the seam 24 than the outer end portion 16. Furthermore, the perforation 26 can be located on the inner portion 20a of the band 20 so that when it is torn apart, it tears the band 20 into two pieces. Additionally, the perforation 26 can also contain an adhesive or light tack glue, that holds it in place against the outer band 20b. The perforation 26 may take any shape but preferably is a line and may span the entire height of the band 20, from the upper edge adjacent the lid 14 to the lower edge adjacent the base 12. The perforation 26 generally aids in directing the direction of the tear through the band 20 upon opening and helps to open or separate the band 20, allowing the inner layer and the outer layer of the band 20 to separate along the perforation 26 instead of or in addition to separating at the seam 24. Typically, if tearing from the top down (i.e., from the lid 14 area down towards the base 12 area), the band 20 will break at the perforation 26 before breaking at the seam 24 due to a directional change in material as it goes over a skirt of the container 10, which may require more force. However, if tearing from the bottom up (i.e., from the base 12 area upwards towards the lid 14 area), there is no directional change in the material, so the consumer can pull on the extra material and it will usually break at the seam 24. Regardless of what tearing direction is used, the perforation 26 enables a consumer to use less force than tearing a band without a perforation and thus makes the opening of the band 20 much easier. Furthermore, the extra material of the first end 16 overlapping the second end 18 also overlaps the perforation 26, if one is present, and acts as a cover to protect the perforation 26 making it less susceptible to breakage.

[0024] The band 20 may optionally have a visual demarcation adjacent the outer edge of the tab 22 and located on

the inner portion 20a of the band 20. The visual demarcation aids in highlighting the location of the tab 22, since typically the band 20 will be made of a transparent material. The visual demarcation may be a line that is generally parallel to the outer edge of the first end portion 16 and may further be a colored line, such as a red-striped line, for example. In addition to the visual demarcation, the band 20 may also optionally contain other features such as a visual indicator to further highlight the existence of the visual demarcation and the tab 22. A visual indicator may consist of a series of arrows, for example, which point to the visual demarcation.

[0025] The band 20 is typically wide enough such that it can be positioned about a lip of the lid 14 overlapping onto an upper portion of the base 12 adjacent the lid 14 in a closed state, and wraps around the entire perimeter of the container 10. The lid 14 and base 12 of the container 10 may be of any size and shape, but typically generally round shaped containers are used. The containers 10 and respective bands 20 must be able to withstand transportation and storage conditions which are required for the food product therein. Some of the storage conditions for the food and container 10 may be as low as about -5°F, over an extended period of time; the temperature being determined by the food product stored therein. Any type of food storage container or jar 10 may be used, such as a container used for the storage of a frozen dessert topping. The container may be used to store food items, such as a whipped dessert cream topping, mayonnaise, or other condiments.

[0026] The material of construction of the band 20 may be any suitable material which will provide adequate closure about the rim and withstand storage and transportation conditions of the container 10 to minimize or prevent breakage of the band 20 prior to opening the container 10. For example, the band 20 may be a polyvinyl chloride (PVC) material that is heat-shrinkable, such as is available by Bonset, in Greensboro, North Carolina. Any size or thickness material may be used, such as a 2.5 mil thickness PVC layer. A height of about 12.5 mm to about 38 mm may be used for the band, and preferably about 34 mm is used. The length of the pull tab, i.e. the extra flap of material that overlaps the second end, can be from 6.4 mm to about 25.4 mm. The light adhesive used to keep the first end 16 attached to the inner layer 20a or for keeping the perforation along the inner layer 20a attached to the outer layer 20b may be an adhesive such as AL7001 or AL7002 available from Alcoa Inc., in Pittsburgh, Pennsylvania. The diameter of the container may be about 15 cm.

[0027] When the container 10 is to be opened, the consumer can grab a hold of the pull-tab 22, either by grasping its free-standing end or by separating it from the light glue keeping it tacked down to the inner portion 20a of the band 20, and apply a force to the band 20 that is great enough to break the band 20 in order to remove it from around the container 10. If the band 20 consists of only a seam 24, then the force applied should be great enough to overcome the seal at the seam 24 to separate the band 20 and to tear it off of the container 10. If the band 20 also has a perforation 26, then the force applied should be great enough to overcome at least one of the seal at the seam 24 or the perforation 26.

[0028] A variety of methods for applying the band 20 to the container 10 described herein can be utilized. For example, the band 20 can be presealed to itself by a band/film supplier, thus already containing the seam 24. The pre-sealed band film can be supplied on a roll having a "lay-flat" width of about 245 mm, before cutting the roll. The pre-formed band film can then be sent through standard bonding equipment, such as is provided by American Fuji Seal, in Fairfield, New Jersey. As the band film goes through the equipment, a mandrel can open the film and place it on the container 10 and a blade can cut the band film such that the height of the band film about the container 10 is about 34 mm. The container 10 with the band film placed around it can then receive a blast of heat to preshrink the band film around the container 10, followed by the container 10 being passed through a heat tunnel that shrinks the band down even more about the container lid 14 and base 12, such that it fits tightly about the container 10.

EXAMPLE

[0029] The breakage rates of a variety of different bands were tested to determine which design band had the lowest breakage rate. The different bands were produced and placed around similar shaped containers. Each container underwent a six-sided drop from a height of about 24 inches at 0°F. A six-sided drop consisted of dropping each container a total of six times on six different sides of the container from the specified height. Each container was then manually inspected to see if there were any breaks or tears in the band. A control band was used that consisted of a single seam 224, as depicted in FIG. 4A, which is the band that is typically in use with many frozen food products and has a relatively low breakage rate (i.e., about 1.5% to about 4%), however, it can be difficult to open. It is preferred for an easy-open band to have a breakage rate at least as good as the control band. The other bands tested had a variety of features that tend not to be easy to open, as shown in FIGS. 4B-4F. For example, some of the different bands tested consisted of a single micro-perforation (perf) 226 (i.e., a micro-perf contains perforations that are very close to each other in comparison to a regular perforation) (see FIG. 4B), a double perf 228 and 230 (see FIG. 4E), tear tape 232 with double perf 228 and 230 (i.e., where a tear tape 232 provides a path along which the tear is initiated) (see FIG. 4C), a sealed film extension where a free-end extended past the seam 224 is sealed to the band underneath it at a second seal 216 (see FIG. 4D), and a seam 224 with a notch 234 (see FIG. 4F). All of these different bands and a band having the pull tab 22 extending past the seam 24 with a perforation 26, as disclosed herein and shown in FIG. 3, were tested against the control. The

Table below presents the average results from the breakage rate testing.

Band Tested	% Breakage
Control (FIG. 4A)	1.5-4%
Single Perf (FIG. 4B)	59%
Double Perf (FIG. 4E)	35%
Tear tape with Double Perf (FIG. 4C)	34-65%
Sealed film extension (FIG. 4D)	4.8%
Seam with notch (FIG. 4F)	17%
Pull Tab with Seam (FIG. 3)	2%

[0030] The pull tab version of the band (designated as "Pull Tab with Seam") had a breakage rate of about 2% and performed the closest to the control in that its breakage rate was right around the range of the control band, which was desired. The next closest band in terms of performance, was the sealed film extension, however, this band can be difficult to open and does not have an easy to open feature. From the foregoing, it is apparent that the pull tab with seam had reduced breakage in combination with an easy to open feature in the form of the tab 22.

[0031] From the foregoing, it will be appreciated an easy open tamper evident band for a food container is provided that allows for easy removal of the band and where the band can withstand transportation and cold temperatures. However, the disclosure is not limited to the aspects and embodiments described hereinabove, or to any particular embodiments. Various modifications to the easy-open tamper evident band can result in substantially the same band.

Claims

1. A tamper evident seal for a container having an easy-open pull tab comprising:

a band that is wrapped around a perimeter of a container rim, the band having a first end portion and a second end portion;
the first end portion overlaps the second end portion, and the second end portion is sealed to the band along a seam spaced apart from the first end portion;
a perforation adjacent the seam; and
the first end extends past the seam and past the second end to form the pull tab.

2. The tamper evident seal of Claim 1, wherein the container rim includes a lip of a lid and a portion of a base adjacent the lid, and the band includes an inner layer adjacent the container and an outer layer that overlaps the inner layer.

3. The tamper evident seal of Claims 1 or 2, wherein the perforation is a line that generally spans an entire height of the band, from an upper edge adjacent the lid to a lower edge adjacent the base and is between the first end and the seam.

4. The tamper evident seal of any one or more of Claims 1 to 3, wherein the perforation is located on the inner layer of the band and is covered by the outer layer of the band which also includes the pull tab.

5. The tamper evident seal of any one or more of Claims 1 to 4, wherein the seam is positioned along the band between the inner layer and the outer layer and generally spans the entire height of the band from an upper edge adjacent the lid to a lower edge adjacent the base.

6. The tamper evident seal of any one or more of Claims 1 to 5, wherein one of the seam and the perforation do not separate until a tearing force is applied and both withstand temperatures as low as about -5°F without separating.

7. The tamper evident seal of any one or more of Claims 1 to 5, wherein the band has a height of about 34 mm, and keeps the lid and base joined together.

8. The tamper evident seal of Claim 2 or 3, wherein the pull tab is held in place against the inner layer of the band by

an adhesive, and/or wherein the perforation is held in place against the outer layer of the band by an adhesive.

9. The tamper evident seal of Claims 1 or 2, wherein the band is heat shrunk about the container rim and the seam is pre-sealed.

10. The tamper evident seal of Claims 1 or 2, wherein the seam is spaced from the first end portion and positioned between an inner side of the outer layer containing the first end portion and an outer side of the inner layer containing the second end portion, and at the second end portion.

11. A method of removing a tamper evident seal on a container comprising:

grasping a tab at an edge of a first end portion, wherein the first end portion overlaps a second end portion of a band positioned around a perimeter of the container and the second end portion is sealed to the band along a seam spaced from the first end portion; and
pulling the tab to break the band at one of a perforation or the seam.

12. The method of Claim 11, wherein the perforation is adjacent the seam on an inner layer adjacent the container.

13. The method of Claim 11, or the tamper evident seal of Claim 2 wherein the pull tab extends from the seam to the first end and has an overlapping length of about 6.4 mm, to about 25.4 mm.

14. The method of Claim 11, or the tamper evident seal of any one or more of Claims 1 to 6 wherein the band does not separate until a tearing force is applied and further withstands temperatures as low as about -5°F without separating.

15. The method of Claim 11, or the tamper evident seal of any one or more of Claims 1 to 7 wherein the band is made from a polyvinyl chloride material.

16. A tamper evident band for a freezer container having an easy-open pull tab comprising:

the band being wrapped around a perimeter of a container rim, the container rim comprising a lip of a lid and a portion of a base adjacent the lid;
the band having a first end portion and a second end portion, the first end portion overlapping the second end portion;
the second end portion is sealed to the band along a seam spaced apart from the first end portion, the first end portion extending past the seam to form the pull tab; and a perforated line positioned between the seam and the first end portion.

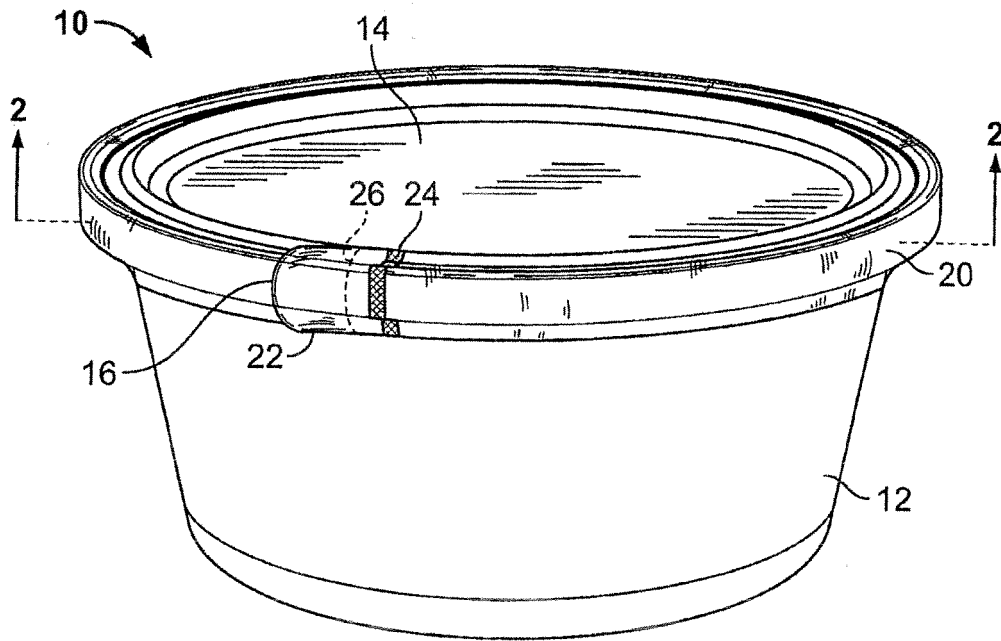


FIG. 1

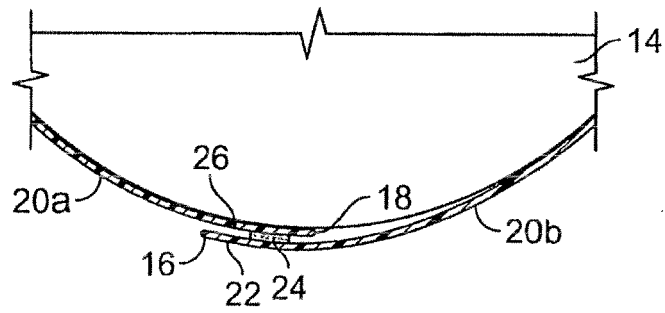


FIG. 2

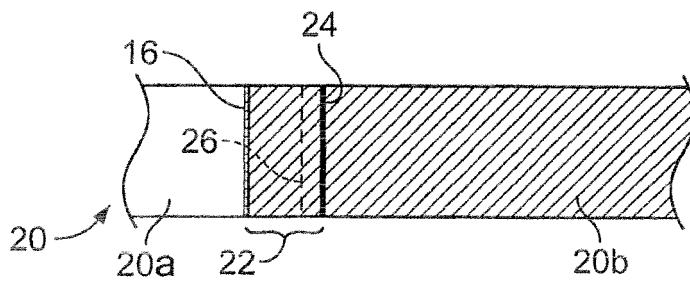


FIG. 3

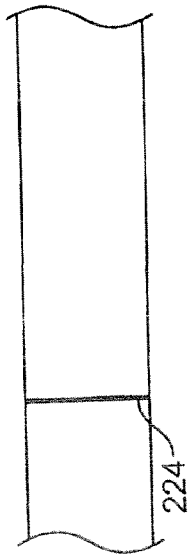


FIG. 4A
(Prior Art)

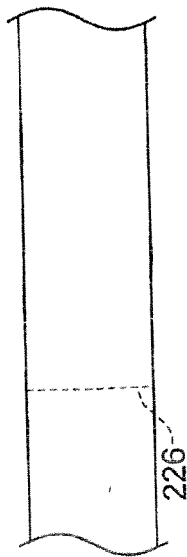


FIG. 4B
(Prior Art)

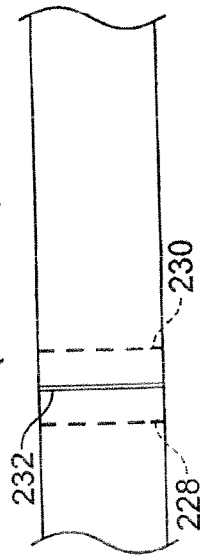


FIG. 4C
(Prior Art)

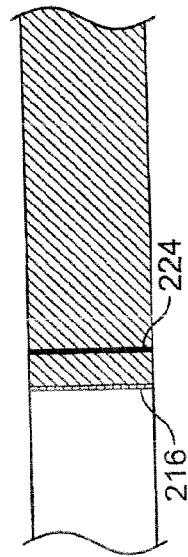


FIG. 4D
(Prior Art)

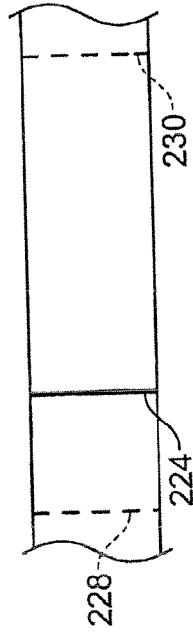


FIG. 4E
(Prior Art)

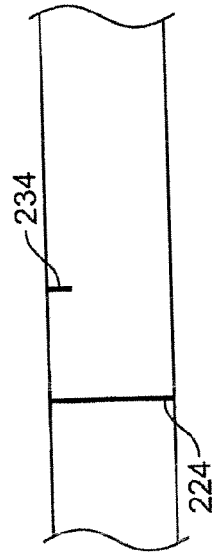


FIG. 4F
(Prior Art)



EUROPEAN SEARCH REPORT

Application Number
EP 08 10 4784

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Y	* abstract; figures *	15	
	* column 11, line 56 - column 12, line 53 *		

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 September 2008	Examiner Dederichs, August
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 10 4784

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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24-09-2008

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