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(54) Packaging restraining an article from moving

(57) A container (10) includes a base (11) and a cover (19) for the base (11). A substantially flat article (20) is enclosed in a pouch (21). The pouch (21) is adhered to the base (11) by an anti-slip agent (24) and an unfilled space (26) of d mm is left between the pouch (21) and the cover (19), so as to restrain the article (20) from moving in the container (10).

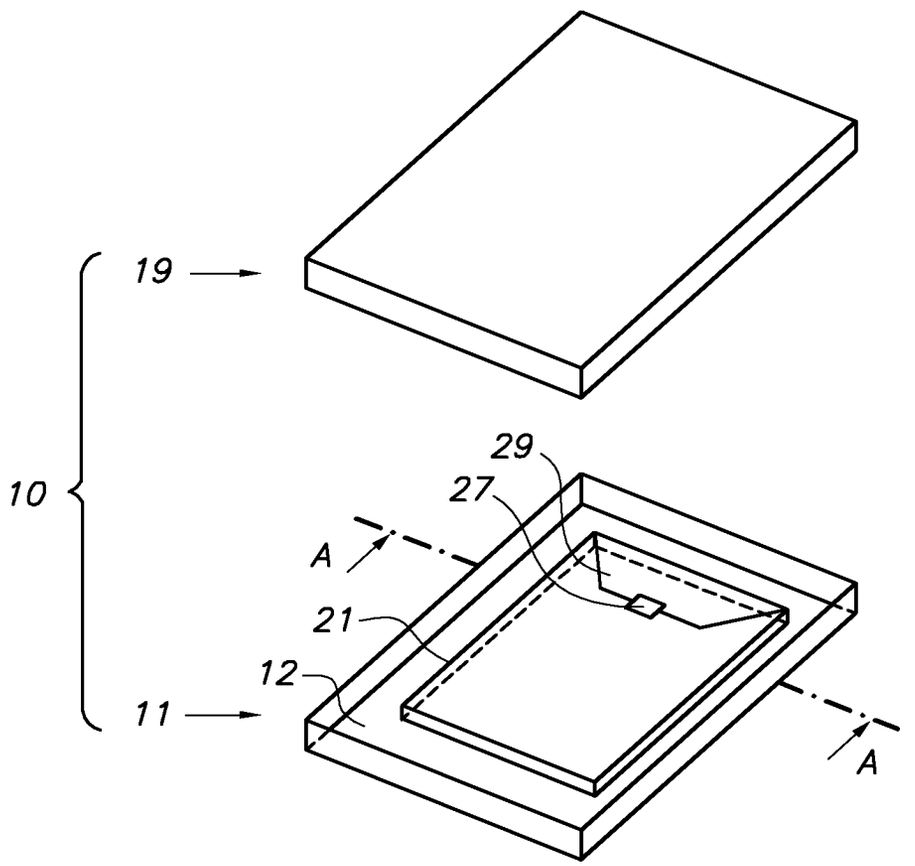

FIG. 3

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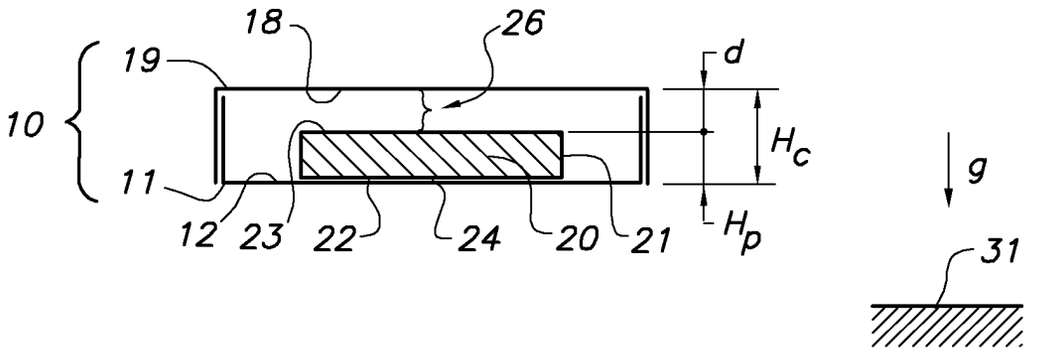

FIG. 4

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a packaging for a substantially flat article. The packaging includes a container that is larger than the article. More specifically the invention relates to a rectangular flat container for a stack of sheets or plates that are smaller than the container.

BACKGROUND OF THE INVENTION

[0002] When packaging an article into a container, and when the container is to be used for articles having several sizes, empty space exists between the article and the walls of the container. When shipping the container holding the article, movement of the article in the container should be restrained in order to prevent damage of the article.

[0003] In particular, when packaging a stack of sheets, especially photographic or thermographic sheets, it is customary to use a set of flat rectangular containers, having a limited number of sizes, for packaging stacks of single size sheets having many possible sizes. A container with a specific size may e.g. hold sheets of a first size, or sheets of a second size, or sheets of a third size. In this way, the required number of different packaging containers is reduced. This is especially interesting for less frequently called-for sheet sizes.

[0004] Fig. 1 shows a prior art container 10 having a base 11 and a cover 19 for the base. The base 11 has a bottom 12 and side walls 13, 14, 15, 16. To restrain movement of the stack of sheets 20 in the container 10 during handling or shipping, it is customary to fill the empty space between the sheets 20 and the side walls with strips of shock-absorbing material 81 and 82, e.g. strips of foamed polyethylene. A drawback is that the strips are cut manually, which is labor-intensive and time-consuming, and which generates dust and dirt.

[0005] Patent application **EP-A-0 945 357** discloses, see Fig. 2, another prior art container 10 for packaging a substantially flat article 20 such as a stack of sheets. The article 20 is retained from moving inside the container by a fixing element 30. The stack of sheets may be enclosed in a pouch. Although this packaging system is less labor-intensive and reduces packaging waste, attaching the fixing element 30 to the bottom 12 of base 11 is still time-consuming.

[0006] There is thus still need for an improved packaging.

OBJECTS OF THE INVENTION

[0007] It is an object of the invention to provide an improved container for holding a substantially flat article, that restrains the article from moving.

SUMMARY OF THE INVENTION AND DEFINITIONS

[0008] The above mentioned objects are realized by a packaging in accordance with the invention as claimed in claim 1. The dependent claims set out preferred embodiments of the invention.

[0009] According to the invention, a substantially flat article, which is preferably a stack of sheets or a stack of plates, is packed in a pouch. The pouch is adhered by an anti-slip agent, such as a cold glue, to the substantially flat bottom of the base of a container, so that the bottom of the pouch cannot move with respect to the base of the container.

[0010] In an embodiment of the invention, there is an unfilled space of d mm, with $d < 5$ mm, between the pouch and the cover of the container. The unfilled space is preferably not larger, because otherwise the pouch could become detached from the bottom of the base of the container during shipping or handling, as is now explained. The pouch is preferably made of a flexible material, such as black-pigmented polyethylene. Moreover, the pouch usually does not enclose the article so tightly that it cannot move at all inside the pouch. Preferably, to avoid damage to the article during handling and shipping, the article is packed so that it cannot bump into side walls of the container, but this may be realized by positioning the pouch far enough from the side walls. Thus, the article may have some play inside the pouch, while damage to the article is still avoided. When moving the container around, the pouch will remain attached to the bottom of the base of the container by the anti-slip agent. However, when holding the container upside down, the pouch will become detached if there is a large unfilled space between the pouch and the cover of the container, because the weight of the article in the pouch will then fully act substantially perpendicularly on the anti-slip agent. If the unfilled space is small enough, at least a portion of the weight of the article will rest on the cover of the container, because of e.g. the flexibility of the pouch and the play of the article in the pouch; in this way, the pouch will still remain attached to the bottom of the base of the container.

[0011] In a preferred embodiment of the invention, there is an unfilled space of d mm, with $d < 2$ mm, between the pouch and the cover of the container, so that there is an even better chance, for heavy articles, that the pouch remains adhered to the bottom of the base of the container under all usual handling circumstances.

[0012] In a still more preferred embodiment of the invention, there is no unfilled space, i.e. $d = 0$, so that the pouch is pressed against the bottom of the base of the container by the cover of the container.

[0013] In all embodiments of the invention described above, a filling piece may be positioned between the pouch and the cover of the container. This may be useful to reduce the unfilled space between the pouch and the cover of the container, in case the inner height of the container, between the cover and the bottom of the base

of the container, is much larger than the height of the pouch. Preferably, the filling piece is attached to the cover of the container or to the top of the pouch. More than one filling piece may be used.

[0014] A "bottom" of a base of a container is the portion of the base that is used to support the pouch; possibly, one or more filling pieces may be attached to the base, so that at least one filling piece is used to support the pouch (see e.g. Fig. 7). These filling pieces are then considered to be part of the base; the bottom of the base is the portion of the base that is used to support the pouch.

[0015] A "substantially flat" bottom of a base is defined as follows. A base is laid on a horizontal flat plane. P is the point of the bottom that has, for all points of the bottom, the largest distance dp to the horizontal plane and Q is the point of the bottom that has, for all points of the bottom, the smallest distance d_q to the horizontal plane. The bottom of the base is substantially flat if the difference $d_p - d_q$ is less than 10 % of the square root of the area of the bottom. For example, a base has a rectangular bottom of 400 mm x 100 mm. The bottom is substantially flat if, when laid on a horizontal flat plane, e.g. a table, $d_p - d_q < 20$ mm **(20 = 0.1 * $\sqrt{400*100}$) .**

[0016] A "substantially flat" article is an article having at least two substantially flat outer surfaces, the areas of these two substantially flat outer surfaces each being larger than each area of each other outer surface of the article.

[0017] An "anti-slip agent" in this document means an agent, such as a cold glue, that is applied either to the pouch bottom or to the bottom of the base of the container or to both so as to adhere the pouch to the bottom of the base of the container; when subsequently exercising a force on the pouch in a direction substantially perpendicular to the bottom of the base of the container, the pouch can easily be removed and the surfaces that were adhered to each other are not sticky after the removal of the pouch so that when the pouch is laid again onto the bottom of the base of the container, there is no adherent force any more.

[0018] Further advantages and embodiments of the present invention will become apparent from the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The invention is described with reference to the following drawings without the intention to limit the invention thereto, and in which:

Figs. 1 and 2 show prior art embodiments of a container holding a substantially flat article;

Figs. 3 and 4 show an embodiment of a packaging according to the invention;

Fig. 5 shows another embodiment of a packaging according to the invention that includes a filling piece;

Fig. 6 shows yet another embodiment of a packaging according to the invention, wherein the pouch is pressed against the bottom of the base of the container by the cover of the container.

Fig. 7 shows still another embodiment of a packaging according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Figs. 3 and 4 show a first embodiment of a packaging according to the present invention. A substantially flat article 20 is enclosed by a pouch 21. The article 20 may be a stack of sheets or a stack of plates, e.g. aluminum printing plates. The sheets or plates may be sensitive to electromagnetic radiation or to heat (such as thermographic sheets or plates). If the substantially flat article 20 is sensitive to electromagnetic radiation, the pouch 21 is preferably made of black-pigmented polyethylene so as to shield the article from electromagnetic radiation; the pouch may however also be made of any other suitable material as known in the art. Preferably, the pouch 21 has - similar to an envelope - an overlapping back portion 29, that may be adhered by tape 27 to the main portion of the pouch. The pouch bottom 22 of pouch 21 is adhered by an anti-slip agent 24 to the substantially flat bottom 12 of base 11 of container 10.

[0021] Fig. 4 is a cross-section of the first embodiment, along plane AA indicated in Fig. 3. In Fig. 3 container 10 is shown open, in Fig. 4 it is closed, i.e. the cover 19 of the container is put onto the base 11. H_p is the height of pouch 21, between the pouch top 23 and the pouch bottom 22. H_c is the inner height of the container, between the underside 18 of cover 19 and the substantially flat bottom 12 of base 11. H_c is determined when the container is closed and when it does not contain pouch 21 yet (in another embodiment, the pouch height H_p may be larger than the inner container height H_c). In the embodiment of Fig. 4, there is an unfilled space 26 of d mm, with $d = H_c - H_p > 0$, between the underside 18 of the cover 19 and the pouch top 23 (the drawings are not to scale; for clarity, dimension d is exaggerated). In other embodiments, in addition to an unfilled space 26 there may be a filling piece 25 or another element between the underside 18 of cover 19 and the pouch top 23. Thus, in general the dimension d of the unfilled space 26 does not need to equal the difference $H_c - H_p$. The dimension d of the unfilled space 26 is defined as the distance that the article 20 would be able to move, in the direction substantially perpendicular to the bottom 12 of base 11, if the pouch bottom 22 was not adhered to the bottom 12 of base 11 and if the closed container 10 is turned upside down. In Fig. 4, the bottom 12 of base 11 of container 10 is substantially parallel to horizontal plane 31 and substantially perpendicular to arrow g which indicates gravity; cover 19 is above base 11 with respect to arrow g. When container 10 is turned upside down, the bottom 12 of base 11 of container 10

is still substantially parallel to horizontal plane 31 but cover 19 is below base 11 with respect to arrow g.

[0022] Fig. 5 shows a cross-section of another embodiment, wherein a filling piece 25 is attached to the underside 18 of cover 19.

[0023] Fig. 6 shows a cross-section of yet another embodiment, wherein the pouch 21 is pressed against base 11 by cover 19. Cover 19 is attached to base 11 by tape 28. Also in the other embodiments of the invention, cover 19 is preferably attached to base 11. In the embodiment shown in Fig. 6, dimension d = 0, i.e. there is no unfilled space 26.

[0024] Fig. 7 shows a cross-section of still another embodiment, wherein a filling piece 32 is attached to base 11 of container 10. As illustrated by Fig. 7, the bottom 22 of pouch 21 is adhered to the substantially flat bottom 12 of base 11 by anti-slip agent 24.

[0025] The anti-slip agent 24 is preferably water-based and solvent-free, for environmental reasons. It is preferred that the anti-slip agent has high shear strength and low tensile strength. Anti-slip agents suitable for use in a packaging according to the invention are e.g. GRIP FIX™ SW 10/1 L and Haftkleber V200, both available from Helmut Rand GmbH, Neuhofen, Germany.

[0026] The base 11 and the cover 19 of container 10 are preferably made of cardboard; they may however also be made of any other suitable material as known in the art. In a preferred embodiment, the container 10 has a cuboidal shape.

[0027] More than one pouch may be packed into a single container. When pouches are stacked onto each other, it is preferred that the lowermost pouch is adhered to the bottom 12 of base 11 by the anti-slip agent 24, as disclosed above, that the pouch on top of the lowermost pouch is adhered to the lowermost pouch by the anti-slip agent 24, etc., so that all pouches of the stack are adhered to each other.

[0028] A packaging according to the present invention has several advantages. The packaging is affordable. The container is reusable since the bottom of the base is not sticky after the removal of the pouch, nor is it damaged by removing the pouch. The packaging method is ecological, convenient, requires little labor and reduces packaging waste. It is easy to automate.

EXAMPLE

[0029] Container, base and cover:

- material : cardboard of 1200 g/m^2
- dimensions : Length x Width x Height = 67.5 cm x 52.1 cm x 3.5 cm
- inner container height H_c = 1.9 cm

[0030] Article :

- stack of 100 film sheets HN7 (manufactured by Agfa), Length x Width x Stack Height = 47.6 cm x 22.6 cm x 1.9 cm

[0031] Pouch :

- material : black-pigmented high density polyethylene, thickness 100 μm
- dimensions : Length x Width x H_p = 78 cm x 57 cm x 1.9 cm
- the pouch has a first overlapping back portion in the direction of its length and a second overlapping back portion in the direction of its width

[0032] Anti-slip agent :

- Haftkleber V200, available from Helmut Rand GmbH.

No filling pieces

Dimension of unfilled space d = 0 mm

[0033] Having described in detail preferred embodiments of the current invention, it will now be apparent to those skilled in the art that numerous modifications can be made therein without departing from the scope of the invention as defined in the appending claims.

List of reference signs

[0034]

10	container
11	base
12	bottom of base
13 - 16:	side walls of base
18	underside of cover
19	cover
20	article
21	pouch
22	pouch bottom
23	pouch top
24	anti-slip agent
25	filling piece
26	unfilled space
27, 28:	tape
29	back portion
30	fixing element
31	horizontal plane
32	filling piece
81, 82:	strip
H_c	inner container height
Hp	pouch height
d	dimension

Claims

1. A combination of a container (10), a pouch (21) and a substantially flat article (20) enclosed by said pouch (21), said pouch (21) having a pouch top

(23), a pouch bottom (22) opposite said pouch top (23) and a pouch height H_p between said pouch top (23) and said pouch bottom (22), said container (10) comprising:

- a base (11) having a substantially flat bottom (12); and
- a cover (19) for said base (11), said cover (19) having an underside (18) facing said pouch top (23);

said container (10) having an inner container height H_c between said substantially flat bottom (12) of said base (11) and said underside (18) of said cover (19);

wherein said pouch bottom (22) is adhered to said substantially flat bottom (12) of said base (11) by an anti-slip agent (24); and wherein said inner container height H_c and said pouch height H_p are such that an unfilled space (26) of d mm is left between said underside (18) of said cover (19) and said pouch top (23), with $d < 5$ mm.

2. The combination according to claim 1 wherein $d < 2$ mm.

3. The combination according to claim 1 wherein $d = 0$ so as to press said pouch (21) against said substantially flat bottom (12) of said base (11) by said cover (19).

4. The combination according to any one of the preceding claims, further comprising a filling piece (25) between said substantially flat bottom (12) of said base (11) and said underside (18) of said cover (19).

5. The combination according to any one of the preceding claims wherein said substantially flat article (20) is sensitive to electromagnetic radiation.

6. The combination according to any one of claims 1 to 5 wherein said substantially flat article (20) is a stack of sheets.

7. The combination according to any one of claims 1 to 5 wherein said substantially flat article (20) is a stack of plates.

8. The combination according to any one of the preceding claims wherein said pouch (21) comprises black-pigmented polyethylene.

9. The combination according to any one of the preceding claims wherein said base (11) comprises cardboard.

10. The combination according to any one of the preceding claims wherein said container (10) has a cuboidal shape.

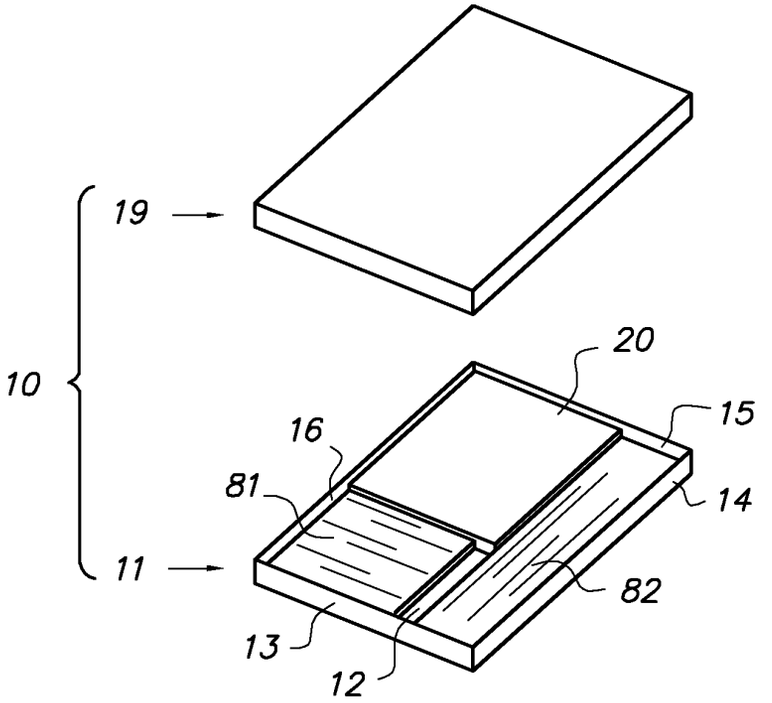

FIG. 1 --Prior Art--

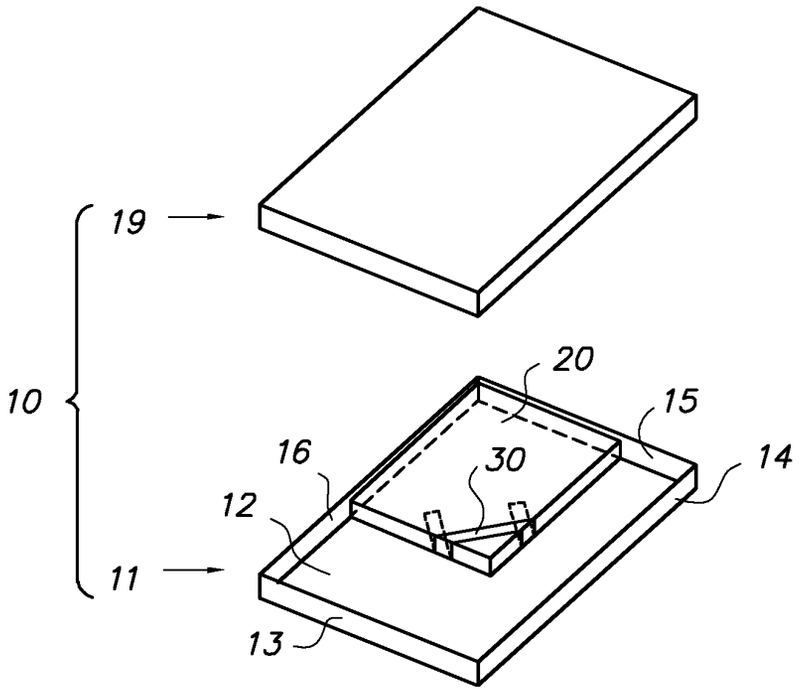

FIG. 2 --Prior Art--

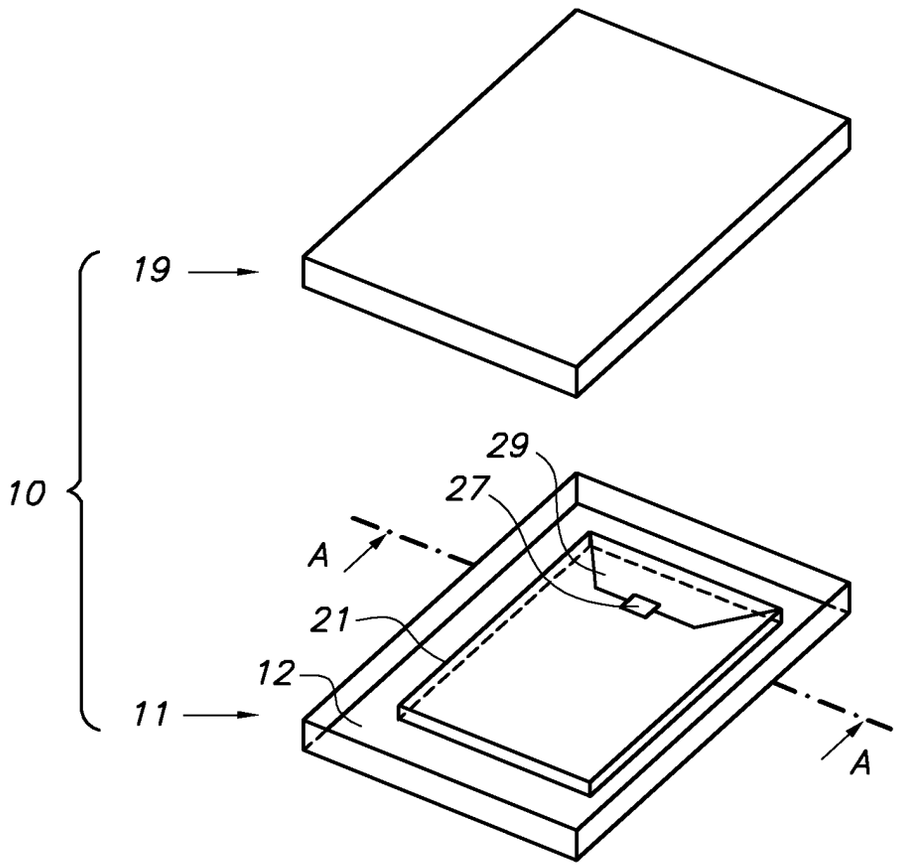

FIG. 3

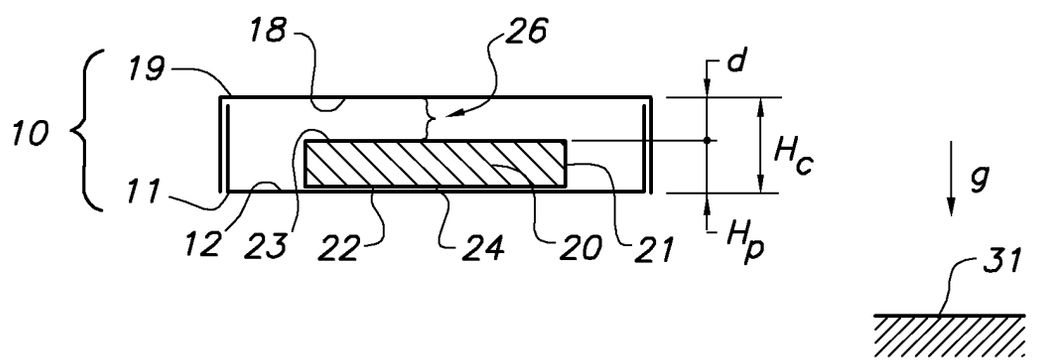

FIG. 4

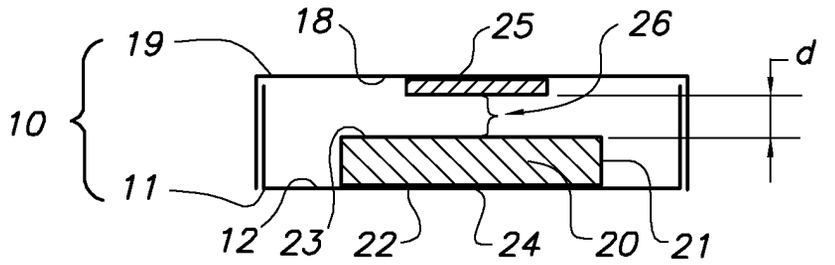

FIG. 5

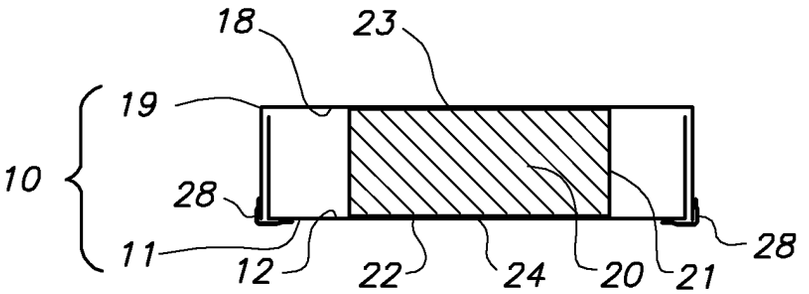

FIG. 6

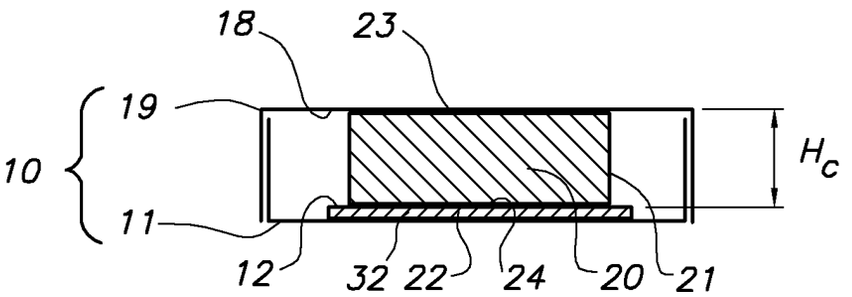

FIG. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 00 0332

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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X	US 3 442 372 A (CARMICHAEL KEITH S ET AL) 6 May 1969 (1969-05-06) * column 1, line 69 - line 72 * * column 2, line 26 - line 66 * * column 3, line 33 - line 41 * * figures 1-5 *	1-4,6,9, 10	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 December 2001	Vigilante, M

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

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THE HAGUE	18 December 2001	Vigilante, M

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