(19) Europäisches Patentamt
European Patent Office
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(11) EP 1 145 986 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.10.2001 Bulletin 2001/42

(51) Int Cl.[7]: **B65D 81/32**

(21) Application number: **01108917.4**

(22) Date of filing: **10.04.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **13.04.2000 IT MI000827**

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(54) Flexible container for products to be kept separate and mixed before use

(57) A flexible container for products to be kept separate and mixed before use, made of single-layer or multi-layer plastic material comprising two compartments (11, 12), intended to contain respective products which are kept separate and mixed before use by breaking a line of separation between said compartments, in which the line of separation is obtained by means of a strip (15) of easy-open material interposed between the walls (13, 14) of the container and extending from one side to the other thereof, so that a weld made along said strip (15) is not permanent, but can be broken upon exceeding a certain force.

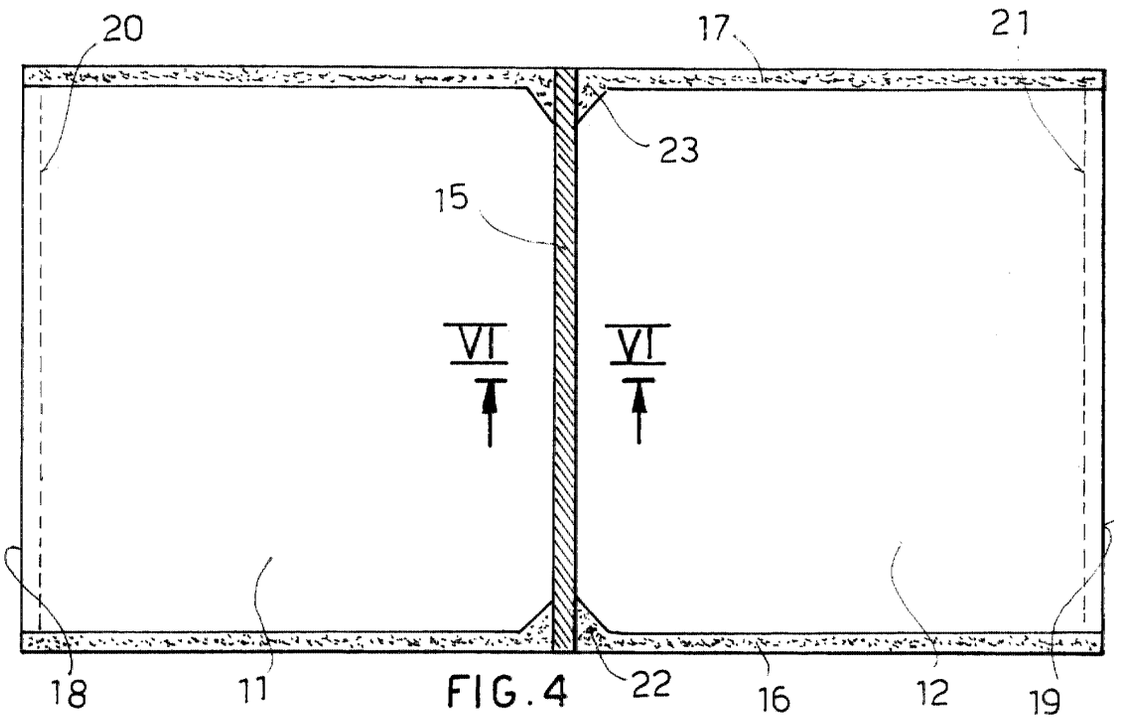

FIG. 4

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Description

[0001] The present invention refers to a flexible container for products normally in a gelatinous state, which must be kept separate from one another and mixed immediately before use.

[0002] Purely by way of example, the products in question can be two substances which, after mixing, form a thermosetting product which can be used, for example, to make perfectly tight connections of electrical cables, for example in desert regions.

[0003] In practice, such containers consist of bags or envelopes of plastic material, with an intermediate transverse closure, so as to define two separate compartments, able to receive the corresponding products.

[0004] The most widely used solution of the prior art for obtaining such separate compartments is illustrated in appended Figures 1 and 2, which show respectively an axonometric view of the container and a median section taken along the line II-II.

[0005] As can be seen, the container, designated with reference numeral 1, is obtained from a tube, which before closure at both ends, is clamped in a transverse median area between an elastic element 2 of iron or plastic, substantially circular in section, and a corresponding rod 3, of relatively soft material, for example rubber.

[0006] In this manner, the tube 4, being clamped between the elements 2 and 3, determines a separation of the container into two compartments, indicated respectively with 5 and 6, which are open at the respective ends, to be able to be filled with the corresponding products, and subsequently sealed along the welding lines denoted by reference numerals 7 and 8.

[0007] As illustrated schematically in Figure 1, the rod 3 protrudes at least from one side of the container 1, so as to allow the elastic element 2 to be gripped and withdrawn when the products have to be mixed. Once the rod has been withdrawn, the elastic element 2 can also be removed, thus placing the two compartments 5 and 6 in communication for mixing the products.

[0008] Such a solution proves rather complex, laborious and not entirely reliable.

[0009] In fact, it is necessary to resort to additional elements, in different materials, to divide the container into two compartments, making automated filling of the container extremely difficult, if not impossible.

[0010] Moreover, there is the risk of said additional elements becoming disengaged, following accidental knocks, for example, causing premature mixing of the components.

[0011] Also, the presence of said additional elements makes the containers awkward to handle.

[0012] The object of the present invention is to eliminate the above-mentioned drawbacks, providing a container in flexible material for products that are to be kept separate and mixed before use, that is extremely simple to make, cheap, reliable and above all does not have additional external elements.

[0013] This object is achieved, in accordance with the invention, with the characteristics expressed in appended independent claim 1.

[0014] Advantageous embodiments of the invention are described in the dependent claims.

[0015] Essentially, the container according to the invention has, in the area of delimitation between the two compartments containing the respective products, a strip of easy-open material, which holds the two walls of the container together during storage and transportation but allows separation thereof when the two products must be mixed, for example by exerting pressure on at least one of the compartments containing said products.

[0016] The strip of easy-open material, which is of the same material as the inner layer of the walls of the container, for example polyethylene or modified polypropylene, advantageously extends to the side edges of the container, in order to make the weld in said area stronger. Therefore, to avoid the risk of possible loss of the tight seal at the side edges of the strip, the welds of the side edges of the container in this area have a triangular shape which joins up to said strip of easy-open material.

[0017] During formation of the container, the two compartments can be left open at the opposite head ends of the container or at the same side of the container, depending upon the type of filling that is to be done.

[0018] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment thereof, illustrated in the appended drawings, in which:

Figures 1 and 2 are respectively an axonometric view and a sectional view of a flexible container for two products which are to be kept separate and be mixed immediately before use, according to the prior art;

Figure 3 is an axonometric view of a container in flexible material according to the invention;

Figure 4 is a schematic plan view of a container according to the invention, in an embodiment in which the products are introduced into the corresponding compartments from respective opposite head ends of the container;

Figure 5 is a view like that in Figure 4, in which the products are introduced into the container from the same side thereof;

Figure 6 is a sectional view taken along the plane VI-VI of Figure 4 or Figure 5.

[0019] A flexible container according to the invention, shown in its final form in Figure 3, is designated as a whole by reference numeral 10. In a plan view said con-

tainer has a substantially rectangular shape, and is divided along the centre line into two separate compartments 11, 12 intended to receive two products to be mixed immediately before use.

[0020] The material making up the container 10 is a multi-layer material, with at least one weldable inner layer, for example in polyethylene or polypropylene, so as to be able to obtain the container 10 by means of welding along the edges of sheets or rectangular walls 13, 14, visible in particular in the section of Figure 6.

[0021] In practice, the container 10 is formed by making a weld along the perimeter of the rectangular walls 13, 14, leaving some sides unwelded to allow the products to be introduced into the respective compartments 11, 12 and subsequently closing said sides. This can be done in the manner that will be better described hereinunder, with reference to the embodiments illustrated in Figures 4 and 5 respectively.

[0022] According to a basic characteristic of the invention, in order to obtain the separation of the container 10 into two compartments 11, 12, disposed between the two walls 13, 14, along the midline, or in any case in an intermediate area of the container, there is a strip 15 of easy-open material, that is of a material of the same type as that of the inner layer of the walls 13, 14, thus polyethylene or polypropylene, suitably modified, so that a weld in the area where said material is disposed is not permanent, but allows separation of the welded walls 13, 14 when a certain force is exceeded.

[0023] During formation of the container 10, the strip 15 of easy-open material is disposed between the two opposite walls 13, 14 and then the welds which allow the two open compartments 11, 12 to be obtained are made.

[0024] According to Figure 4, two side welds 16, 17 are made along the entire length of the container, obviously besides a transverse weld on the strip of easy-open material 15. In this manner, respective openings 18, 19 remain, at opposite head ends of the container 10, for filling of the compartments 11, 12, openings that are subsequently closed, after filling of the container, with weld lines 20, 21.

[0025] As can be seen in Figure 4, in order to improve the hold of the side welds 16, 17, triangular welds 22, 23, which determine corner joining areas between the lateral welds 16, 17 and the easy-open strip 15, are made at the ends of the strip of easy-open material 15, which are disposed thereunder.

[0026] This solution has been found to be the most reliable for avoiding breaking of the seal in these areas and at the same time ensuring a safe separation between the compartments 11, 12.

[0027] The alternative of interrupting the strip of easy-open material 15 at the edges of the container, that is inside the lateral welds 16, 17 might impair the separation between the compartments 11, 12.

[0028] The strip of easy-open material 15 may only partly involve the line of separation between the two compartments 11, 12, so as to allow the passage of products from one compartment to another in any case during the mixing stage.

[0029] The container thus realized allows mixing of the products contained in the compartments 11, 12 before use, by breaking the line of separation obtained along the strip of easy-open material 15, by exerting a certain pressure on at least one of the compartments 11, 12.

[0030] Figure 5 shows a different method of forming the container 10, whereby two welds 20, 21 are first made along the head sides of the container, whereas the lateral weld 17 is made after filling of the compartments 11, 12, which in this case takes place through openings 18' and 19' provided on the same side of the container.

[0031] Having the openings 18, 19 at opposite head ends of the container (Figure 4) or the openings 18', 19' on a same side (Figure 5) depends upon the type of machine that is used to form the container.

[0032] Thus, for example, in the case of Figure 5, the container 10 is made by forming a vertical tube, welding along the edges 20, 21 and after cutting, making the bottom weld 16, so that the container has the two compartments 11, 12 with the respective openings 18', 19' facing upward, in order to be able to be filled at the same time by means of two respective nozzles.

[0033] In the case in Figure 4, on the other hand, normally first one compartment, for example compartment 11, is filled and than sealed, making the head weld 20, and then the other compartment 12 is filled and sealed, making the corresponding head weld 21.

[0034] The afore going description makes clear the advantages of the invention, which makes it possible to obtain a container in flexible material for products to be kept separated and mixed immediately before use, which does not require additional external elements and is made in an extremely simple and economical way.

[0035] Of course the invention is not limited to the particular embodiment described above and illustrated in the appended drawings, but numerous modifications of detail within the reach of a person skilled in the art can be made thereunto, without thereby departing from the scope of said invention, defined solely by the claims that follow.

Claims

1. A flexible container for products which are to be kept separate and mixed before use, said container (10) being made by means of peripheral welds (16, 17, 20, 21) of sheets or walls (13, 14) of single-layer or multi-layer plastic material, and comprising at least two compartments (11, 12), kept separate from one another, able to contain respective distinct products, **characterized in that** the separation between said compartments (11, 12) is obtained at least in

part by means of a strip (15) of easy-open material interposed between said walls (13, 14) of the container (10), such that a weld along said strip (15) is not permanent and is breakable at the time of use to allow mixing of said products.

2. A container according to claim 1, **characterized in that** said strip of easy-open material (15), partially involves said line of separation between the compartments (11, 12).

3. A container according to claim 1, **characterized in that** said strip of easy-open material (15) involves said line of separation between the compartments (11, 12) on the inside and extends between two opposite edges of the container.

4. A container according to claim 3, **characterized in that** said container (10) has a substantially rectangular plan and said strip (15) of easy-open material extends for the entire length of a side of said rectangle, from one end to the other thereof.

5. A container according to claim 4, **characterized in that** at the ends of said strip (15) of easy-open material respective triangular welds (22, 23) are provided between the walls (13, 14) of the container, joining respective portions (16, 17) of said peripheral weld of the container to said strip (15), so as to avoid possible loss of the tight seal at the ends of said strip (15) of easy-open material.

6. A container according to any one of the preceding claims, **characterized in that** said strip (15) of easy-open material is preferably of the same material as the inner layer of said walls (13, 14) of the container, suitably modified to make the subsequent weld less strong, in particular polyethylene or modified polypropylene.

7. A container according to any one of the preceding claims, **characterized in that** said compartments (11, 12) have respective openings (18, 19) at opposite head ends of the container, for filling with the respective products, before making the corresponding peripheral closing welds (20, 21).

8. A container according to any one of claims 1 to 6, **characterized in that** said compartments (11, 12) have respective openings (18', 19') on a same side of said container (10), for filling with the respective products, before a corresponding peripheral closing weld (17) is made.

FIG. 1

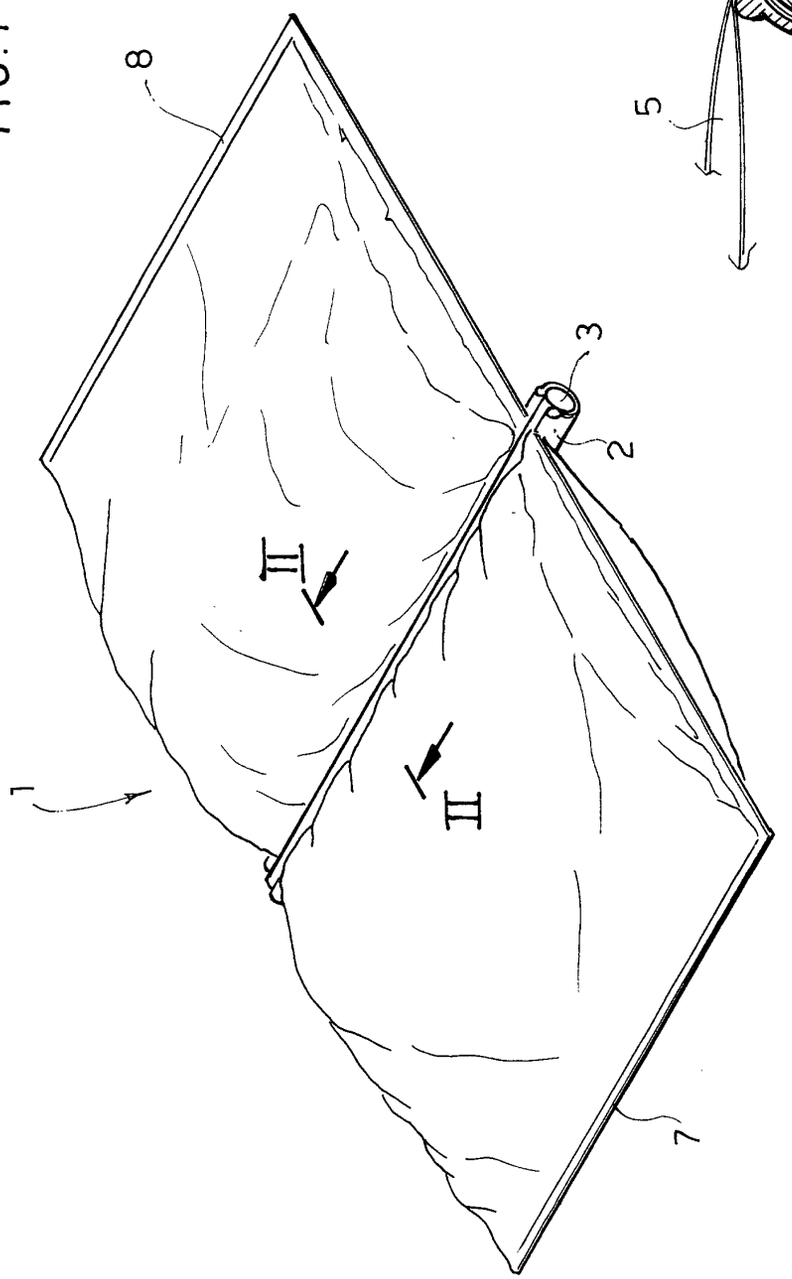
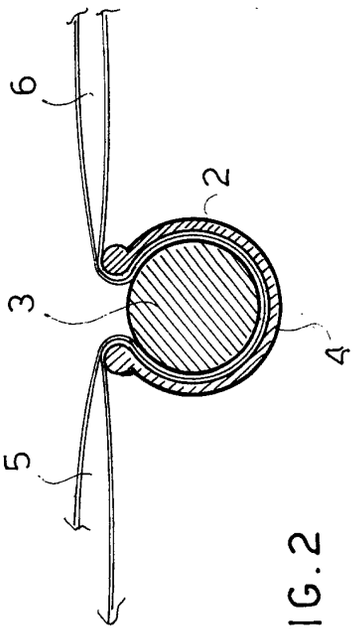


FIG. 2



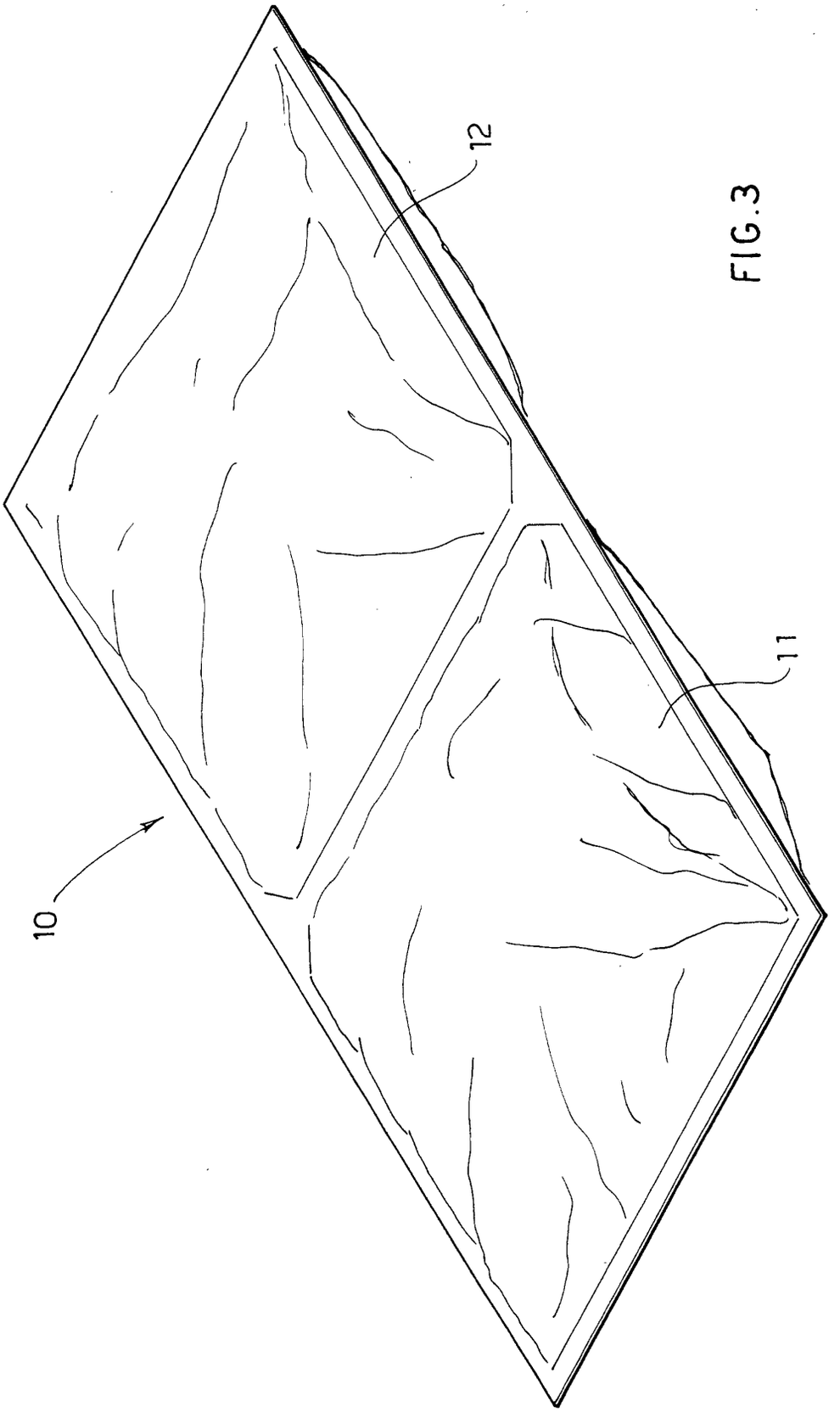


FIG.3

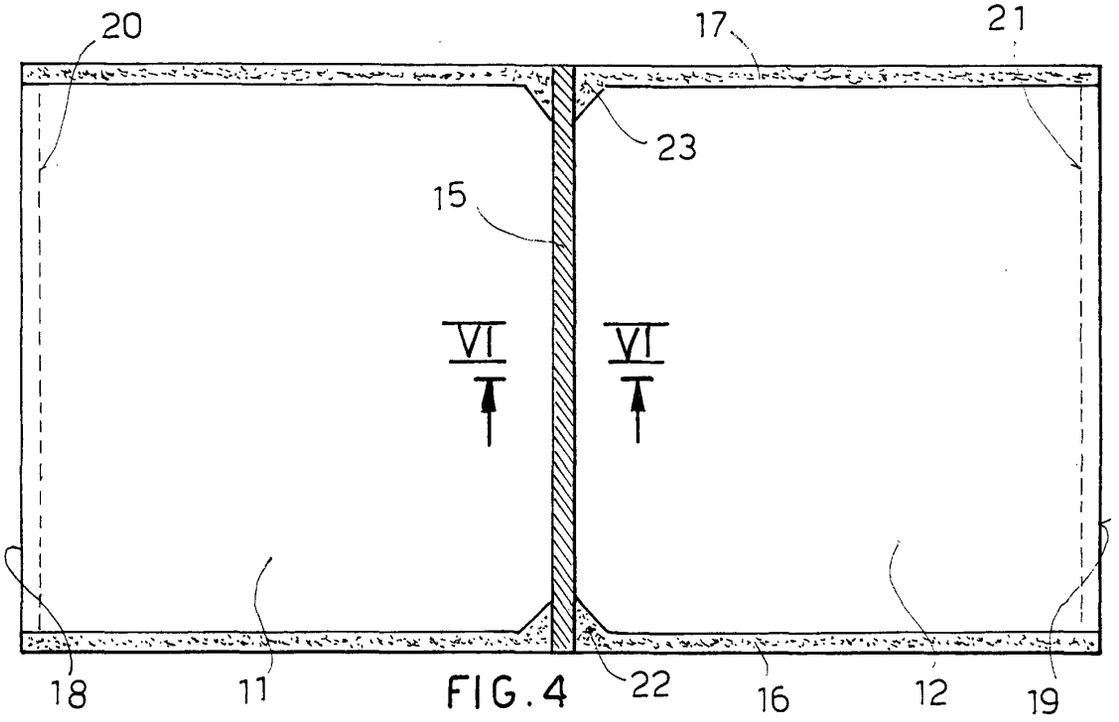


FIG. 4

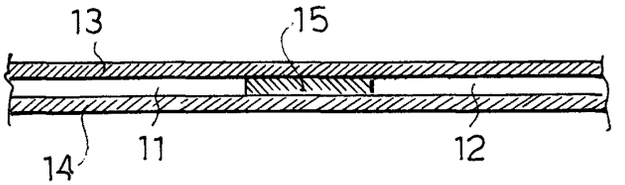
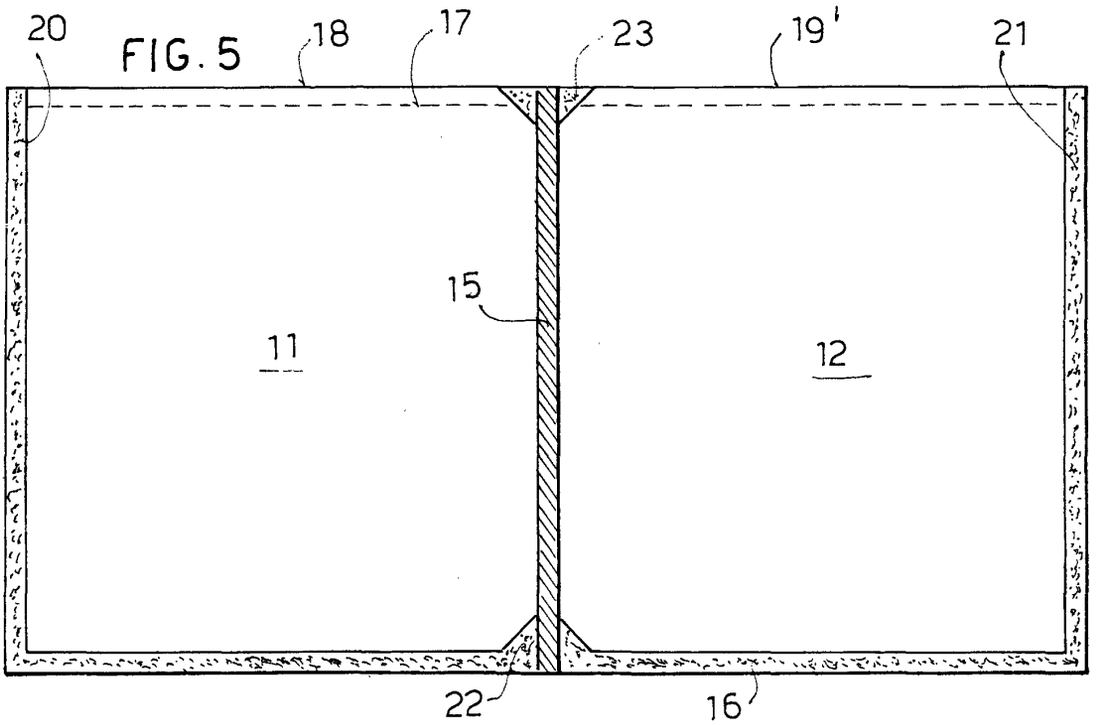


FIG. 6

FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 8917

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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	11 July 2001	Berrington, N

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