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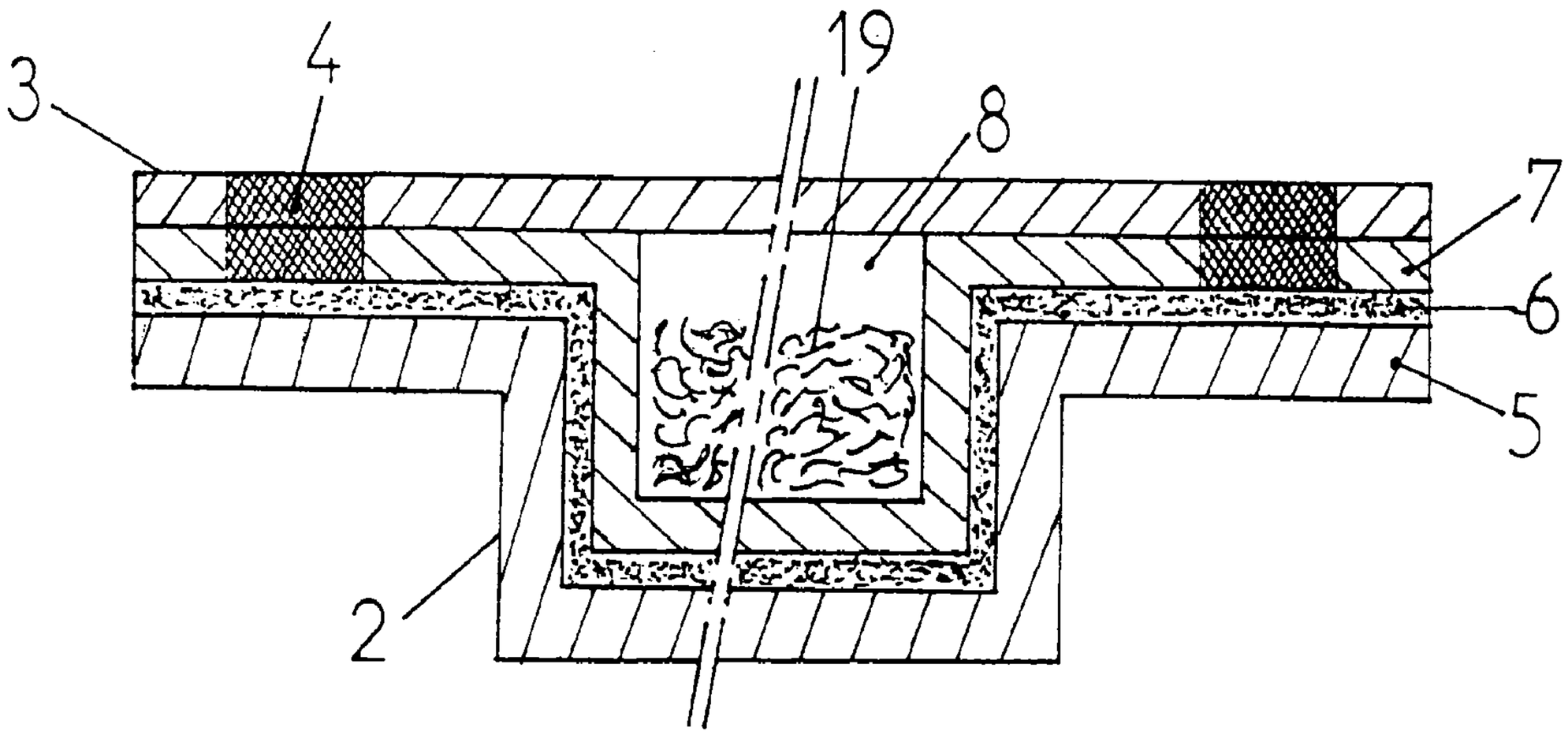
(54) **EMBALLAGE POUR LE CONDITIONNEMENT DE PRODUITS ALIMENTAIRES ET MEDICAL AVEC OUVERTURE FACILE ET REFERMETURE**

(54) **WRAPPING FOR THE CONDITIONING OF FOOD AND MEDICAL PRODUCTS WITH EASY OPENING AND CLOSING DEVICE**



(57) Package (1) for the packaging of solid, liquid or pasty foodstuffs (19), such as dairy products, delicatessen products and meats and for the packaging of medical products, allowing for simple opening and reclosing of a cover over the package, composed of: - a rigid or flexible tray (2) using a thermoformable structure consisting of: - an outer supporting layer (5) of amorphous polyester, - an intermediate permanent-adhesive layer (6), - an inner weldable layer (7) of polyethylene, - a cover (3) consisting of a weldable layer of polyethylene, or a thermoformable structure similar to that of the tray (2). This package is characterised in that the package (1) has an impermeable, tight pouch (8) which receives the solid, liquid or pasty foodstuff or medical product (19), delimited by: - the weldable layer (7) of the tray (2), - the weldable layer forming the cover (3), - the weld bead (4), in order to strengthen the hermetic seal of the package (1) and to preserve its tightness until the use-by date of the foodstuff (19) prior to the first opening of the package (1). This invention will be used, inter alia, in industries for the manufacture of packages and for the packaging of foodstuffs or medical products subsequently made available in supermarkets or pharmacies.

ABSTRACT

Package (1) for the packaging of solid, liquid or pasty foodstuffs (19), such as dairy products, delicatessen products and meats and for the packaging of medical products, allowing for simple opening and reclosing of a cover over the package, composed of:

- a rigid or flexible tray (2) using a thermoformable structure consisting of:
  - an outer supporting layer (5) of amorphous polyester,
  - an intermediate permanent-adhesive layer (6),
  - an inner weldable layer (7) of polyethylene,
- a cover (3) consisting of a weldable layer of polyethylene, or a thermoformable structure similar to that of the tray (2).

This package is characterised in that the package (1) has an impermeable, tight pouch (8) which receives the solid, liquid or pasty foodstuff or medical product (19), delimited by:

- the weldable layer (7) of the tray (2),
- the weldable layer forming the cover (3),
- the weld bead (4),

in order to strengthen the hermetic seal of the package (1) and to preserve its tightness until the use-by date of the foodstuff (19) prior to the first opening of the package (1).

This invention will be used, inter alia, in industries for the manufacture of packages and for the packaging of foodstuffs or medical products subsequently made available in supermarkets or pharmacies.

Figure 1.

The invention relates to a package for the packaging of solid, liquid or pasty foodstuffs, such as dairy products, delicatessen products and meats, and of medical products.

It will be used in industries for the manufacture of films for food and packages, and for the packaging of foodstuffs subsequently made available to consumers in shops.

The use of packages for solid or pasty foodstuffs has long since been known. They consist, e.g. of a tray and a cover, also referred to as a seal, made from a thermoformable film suitable for contact with food.

Foodstuffs can be packaged in accordance with the following steps: the roll of plastic film is unwound, then thermoformed in order to produce the tray. The tray is then filled with the foodstuff to be packaged. The cover is then closed over the tray by welding, after the injection of an inert gas in order to preserve the foodstuff.

When the package is opened at the time of consumption of the foodstuff, the weld is broken by the user and the cover is separated from the tray. It is then impossible for the cover to be reclosed over the tray, forcing the user either to consume the product all at once or to use a protective film to preserve the freshness of the product or to prevent the odours from the product spreading within the refrigerator.

It is known in the prior art to produce packages for foodstuffs provided with a device for reclosing the cover over the tray.

The tray is made by thermoforming from a rigid or flexible film of PVC, polyester or a similar plastic.

The cover used on the market today is made from a film consisting of three layers:

- an inner weldable layer welded along a bead against the edge of the opening of the tray,
- an outer layer which both forms the rigid element of the cover and provides protection against oxygen in order to preserve the food,
- an intermediate permanent-adhesive layer.

When the package is used for the first time, the weld bead is detached from the weldable layer and remains integral with the tray. The adhesive layer is then exposed on the cover at the weld bead. This allows the package to be reclosed after its first use and allows the product to be consumed in several portions over several days or several hours.

It has been noted that, when the cover is welded on to the tray, "pockets" are produced on the adhesive layer, these allowing the inert gas for preserving the foodstuff to escape and oxygen to penetrate into the package, thereby oxidising the foods and reducing their shelf life.

As the adhesive layer is situated in front of the layer providing protection against oxygen, the "pockets" completely destroy the efficiency and properties of the oxygen barrier layer. This therefore means that the solid or pasty foodstuffs become perishable before they are first consumed and that the use-by date of the solid or pasty foodstuffs cannot be specified precisely.

These "pockets" are produced on the package when the cover is welded on to the tray as variations in temperature of the thermoforming machines and in welding pressures are too high or too low.

This invention remedies these disadvantages and one of its main aims is to provide a package for the packaging of foodstuffs, the manufacture of which allows the preservative inert gas to be kept perfectly within the package, thereby allowing for a precise guarantee of the shelf life of the product prior to the first use and therefore prior to the use-by date of the foods.

Another aim of this invention is to enclose the solid or pasty foodstuff within a pouch allowing the packaged product to be preserved in its entirety and without any deterioration of the latter.

Another aim is to eliminate the disadvantages resulting from "pockets" on the adhesive layer allowing the preservative inert gas to escape and oxygen to penetrate into the package, as, in this invention, the "pockets" on the adhesive layer no longer open into the pouch, which thus remains tight and impermeable.

This therefore provides more flexibility when using thermoforming machines, as the variations in temperature and welding pressure are no longer as important or significant and the machines therefore no longer require such strict temperature and pressure control. The aim of this is to simplify the technology used for control and therefore to reduce the cost thereof.

Another aim is to produce the package without any modification of the existing automatic thermoforming machines on the market, the processes for the manufacture of the package and for the packaging of the food product being identical to those existing at present.

Another aim of this invention is to provide a package with simple opening and reclosing of the cover over the tray, thereby dispensing with the need to use protective films to preserve the product when the latter is not consumed completely upon the first use. Reclosing the package also serves to keep the odours from the foodstuff within the package instead of spreading within the refrigerator.

Other aims and advantages of this invention will be clear from the following description given solely by way of a non-limiting example.

Package (1) for the packaging of solid, liquid or pasty foodstuffs, such as dairy products, delicatessen products and meats and for the packaging of medical products, allowing for simple opening and reclosing of a cover over the package, composed of:

- a rigid or flexible tray (2) using a thermoformable structure consisting of:
  - an outer supporting layer (5) of amorphous polyester or the like,
  - an intermediate permanent-adhesive layer (6),
  - an inner weldable layer (7) of polyethylene,
- a cover (3) consisting of a weldable layer of polyethylene, or a thermoformable structure similar to that of the tray (2),

characterised in that the package (1) has an impermeable, tight pouch (8) which receives the foodstuff, delimited by:

- the weldable layer (7) of the tray (2),
- the weldable layer forming the cover (3),

- the weld bead (4),

in order to strengthen the hermetic seal of the package (1) and to preserve its tightness until the use-by date of the foodstuff (19) prior to the first opening of the package.

The invention will be more readily understood from the following description with reference to the accompanying drawings, in which:

Figure 1 is a highly enlarged diagrammatic cross section of the package (1) for solid or pasty foodstuffs (19) prior to its first use;

Figure 2 is a detailed sectional view showing the composition of the weldable layers and the welding of these elements;

Figure 3 is a diagrammatic sectional view of the package (1), with a reduced portion, after the first opening of the cover (3), and

Figure 4 is a diagrammatic top view of the package (1).

This invention relates to a package (1) for the packaging of solid or pasty foodstuffs (19), such as dairy products, delicatessen products or meats. It will be used, inter alia, in industries for the manufacture of packages and for the packaging of foodstuffs and medical products subsequently made available to consumers in supermarkets or pharmacies. It may also be used for other ironmongery products.

Figure 1 shows the package (1) for foodstuffs (19). The package (1) consists of a tray (2) and a cover (3), also referred to as a seal, these two elements being assembled by means of a weld (4). The weld (4) of the cover (3) is effected over the entire periphery of the tray (2), as shown by Figure 4.

The tray (2) is made by means of a thermoformable structure in the form of a film. The film is composed, e.g. of at least three layers:

- an outer supporting layer (5),
- an intermediate adhesive layer (6),
- an inner weldable layer (7) which will be in contact with the foodstuff.

In a preferred, but non-limiting embodiment, the outer supporting layer (5) is made of an amorphous polyester having a thickness which can vary from ten to five hundred

microns or more depending on the rigidity, resistance or flexibility it is desired to obtain for the tray (2).

In another embodiment, it can be made of materials, such as PVC, polypropylene, polyethylene, expanded polyester, polyamide, polycarbonate or polystyrene.

The intermediate adhesive layer (6) is made by means of an adhesive resin or another thermoplastic synthetic material. It should have an almost permanent adhesive effect in order to provide gluing properties allowing the cover to be opened and reclosed several times when the product is consumed in several portions. Its thickness is preferably fifteen to twenty microns in order to ensure permanent gluing properties and to ensure the connection between the inner weldable layer (7) and the outer supporting layer (5).

The inner weldable layer (7) is made by means of a polyethylene preferably composed of five layers (9, 10, 11, 12 and 13), shown in diagrammatic form in Figure 2, the total thickness of which is more than twenty-five microns. It must be suitable for welding and for fusion with another weldable layer of the same type. It must be suitable for welding and fusion to a sufficiently wide extent to be able to withstand temperature and pressure variations.

The cover (3) of the package (1) is of the same type as and of an identical structure to the weldable layer (7) of the tray (2). It is preferably composed of five layers (14, 15, 16, 17 and 18) shown in diagrammatic form in Figure 2, made of polyethylene having a thickness of more than thirty microns and these properties must be identical to those of the weldable layer. It must have good dimensional properties allowing it to support the printing of ink and of text or images representing the solid or pasty foodstuff (19) contained in the package (1).

The thermoformable structure of the tray (2) is produced, e.g. by thermal deposition of the thermoformable synthetic permanent-adhesive layer (6) on to the supporting layer (5) of amorphous polyester by a coating process carried out at a temperature of approximately 160°C, then by lamination of the weldable layer (7) of polyethylene on to this adhesive layer (6).

The whole assembly is then unwound so as to form a reel ready to be cut for the thermoforming packaging machine.

Another technique used to produce the thermoformable structure consists of thermal extrusion of the adhesive resin forming the adhesive layer (6) between the supporting layer (5) and the weldable layer (7).

For the manufacture of the package (1) and the packaging of the product (19), the structure is, e.g. preheated to a temperature of 100 to 120°C for a period of approximately two seconds, then it is formed on the cavities by means of air and suction in order to obtain the tray (2).

The tray (2) is then filled with the foodstuff or medical product (19) and an inert gas adapted to preserve the product is injected before the tray (2) is closed by the cover (3) by welding it at 160°C for a period of 1.5 seconds at a pressure of 2.5 bar on to the periphery of the tray (2) by means of a weld bead (4) having a width L of 4 to 8 mm.

The parameters can be modified depending on the type of thermoforming machine used, these not being subjected to any modification in view of the fact that the process for the manufacture of the package remains identical to those already existing for conventional packages.

The weld is produced between the weldable layer forming the cover (3) and the weldable layer (7) of the tray (2).

In view of the properties of the two weldable layers, the latter are fused over the entire periphery of the tray (2) and over the entire width of the weld bead (4).

The package (1) thus has a water-impermeable and oxygen-tight or gastight pouch (8). This pouch (8) is delimited by the weldable layer of the cover (3), the weldable layer (7) of the tray (2) and the weld bead (4) over the entire periphery of the package (1). It therefore contains the foodstuff or medical product (19) and the inert gas adapted to preserve the product.

The weldable layer forming the cover (3) and the weldable layer (7) are preferably composed of five layers (14, 15, 16, 17, 18) and (9, 10, 11, 12, 13) respectively, the

layers (11 and 16) being high oxygen barrier layers. The pouch is thus obtained by connecting and combining the high-barrier film and the cover (3), the high-barrier film and the weldable layer (7) and the weld bead (4), thereby ensuring its tightness and impermeability. The inert gas therefore remains in the pouch, simultaneously preventing the penetration of oxygen.

The oxygen or gas permeability, i.e. the quantity of oxygen penetrating into the package or the quantity of inert gas escaping from the package, will therefore be a maximum of 5 $cm^3.m^2/24$ hours.

The manufacturer can thus determine precisely the use-by date of the product (19) and ensure the quality of the foodstuffs (19) distributed to supermarkets.

The cover (3) and the weldable layer (7) should consist of at least three layers, the central layer being the high oxygen barrier film in a preferred embodiment.

During the welding operation, the thermoforming machines are subjected to temperature and pressure variations. In the prior art, these variations produced "pockets" (21) on the adhesive layer in the radial direction of the tray (2), these allowing oxygen to penetrate into the package (1) and preservative inert gas to escape. These "pockets" (21) on the adhesive layer (6) still exist, but they are situated on the adhesive layer (6) outside the hermetic pouch (8) comprising a high oxygen barrier film. The "pockets" (21) therefore have no adverse effect on the package (1) as they do not open into the pouch (8).

The inert gas is duly preserved in the interior of the hermetic pouch (8) without any oxygen penetrating into the latter. The quality of the solid, liquid or pasty foodstuffs or medical products (19) is therefore preserved until their use-by date.

In addition, as these "pockets" (21) on the adhesive layer (6) no longer have an adverse effect on the packaging of the solid, liquid or pasty foodstuffs or medical products (19), the package manufacturers therefore have greater flexibility with respect to temperature and pressure variations of the thermoforming machines. The devices for controlling temperature and pressure on the machines can be simplified or less accurate, thereby reducing the cost of monitoring and control equipment.

When the package (1) is opened for the first time for consumption of the solid or pasty foodstuff (19), the user exerts sufficient force to separate the weld bead (4) from the tray (2) at least over part of the periphery of the package (1) and removes the cover (3) from the tray (2), as shown in Figure 3.

In order to carry out this operation, the consumer is provided with a tab (20) on the cover (3) of the package (1) promoting a better grip to pull on the cover (3) and separate it from the tray (2), as shown in Figure 4. By separating the weld bead (4) from the tray (2), the consumer frees the permanent-adhesive layer (6) at the weld bead (4) over the entire periphery of the package (1) and opens the pouch (8), the pouch then losing its tightness and impermeability properties.

The solid or pasty foodstuff (19) is then in contact with oxygen and the preservative inert gas is no longer effective. The consumer must therefore consume the foodstuff (19) within a few days, after which time it will have lost its quality and its flavour and will be perishable.

The part of the adhesive layer (6) freed on the periphery of the package (1) has a width L equal to that of the weld bead (4). In a preferred embodiment, its width L is four to eight millimetres. The consumer can thus reclose the cover (3) over the tray (2) several times by virtue of the permanent effect of the adhesive layer (6). Reclosing the package (1) therefore keeps the remaining part of the foodstuff (19) protected from humidity in the refrigerator and also prevents the odours released by the product (19) from spreading within the refrigerator.

The consumer therefore no longer has to use protective film in order to obviate its disadvantages or is no longer forced to consume the product all at once.

So that the weld bead (4) can be separated from the tray (2) and not from the cover (3), the resistance of the weld bead (4) must be higher at the cover (3) than at the tray (2), i.e. promoting detachment of the weld bead (4) at the tray (2).

In order to achieve this, clamping pressure is exerted on the weld bead (4) at a given temperature, thereby promoting deformation (22) of the weldable layer (7) and of the cover (3). This deformation becomes permanent when the weld cools. These two

elements are deformed as a result of the fact that they fuse and are subjected to pressure. On the other hand, the supporting layer (5) of the tray (2) undergoes virtually no deformation as a result of the nature of the material used, which fuses very little at the temperature applied.

Deformation of the layer (7) should therefore be promoted over deformation of the cover (3) in order to promote the detachment of the weld bead (4) from the tray (2). In order to emphasise this point, it is also possible to use a greater thickness for the weldable layer forming the cover (3) than for the weldable layer (7). Resistance will therefore be higher at the cover (3) than at the weldable layer (7) at the weld bead (4) when the consumer opens the package (1) for the first time.

Other embodiments of this invention within the competence of the person skilled in the art may be envisaged without thereby going beyond the scope of this invention.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. Package (1) for the packaging of solid, liquid or pasty foodstuffs (19), such as dairy products, delicatessen products and meats and for the packaging of medical products, allowing for simple opening and reclosing of a cover over the package, composed of:

- a rigid or flexible tray (2) using a thermoformable structure consisting of:
  - an outer supporting layer (5) of amorphous polyester,
  - an intermediate permanent-adhesive layer (6),
  - an inner weldable layer (7) of polyethylene,
- a cover (3) consisting of a weldable layer of polyethylene, or a thermoformable structure similar to that of the tray (2),

characterised in that the package (1) has an impermeable, tight pouch (8) which receives the solid, liquid or pasty foodstuff or medical product (19), delimited by:

- the weldable layer (7) of the tray (2),
- the weldable layer forming the cover (3),
- the weld bead (4),

in order to strengthen the hermetic seal of the package (1) and to preserve its tightness until the use-by date of the foodstuff or medical product (19) prior to the first opening of the package (1).

2. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claim 1, characterised in that the weldable layer (7) of the tray (2) and the weldable layer forming the cover (3) are made of multi-layer polyethylene comprising a high oxygen barrier film producing the hermetic pouch when the cover (3) is welded on to the tray (2).

3. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claim 1, characterised in that the first opening of the package (1) separates the weld bead (4) from the tray (2), frees part of the permanent-adhesive layer (6) on the tray (2) and opens the hermetic pouch in

order to allow the product to be consumed in several portions and the cover to be reclosed over the tray several times.

4. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claims 1 and 2, characterised in that the weldable layer (7) of the tray (2) and the cover (3) have at least three layers and that the central layer is the high oxygen barrier film.

5. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claim 1, characterised in that the weldable layer (7) of the tray (2) and the weldable layer forming the cover (3) fuse together and form one single layer on the periphery of the tray (2) at the weld bead (4), thereby rendering the pouch tight.

6. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claims 1, 3 and 5, characterised in that the weld bead (4) displays higher resistance at the cover (3) than at the weldable layer (7) on the tray (2) when the package (1) is opened.

7. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claims 1 and 2, characterised in that the adhesive layer (6) is situated outside and below the hermetic pouch (8) in order to maintain good tightness in spite of the "pockets" (21) on the adhesive layer (6).

8. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to one of claims 1 to 6, characterised in that the permanent-adhesive layer (6) is freed over the periphery of the tray (2) and has a width L corresponding to that of the weld bead (4).

9. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claim 1, characterised in that the thermoformable structure forming the tray (2) may comprise a supporting layer (5) of thermoplastic material suitable for contact with food other than amorphous polyester in order to modify the properties of the tray (2).

10. Package (1) for the packaging of solid, liquid or pasty foodstuffs or medical products (19) according to claim 1, characterised in that the thermoformable structure has a total thickness of more than forty microns and that:

- the weldable layer (7) of the tray (2) and the weldable layer forming the cover (3) have a thickness of several tens of microns.

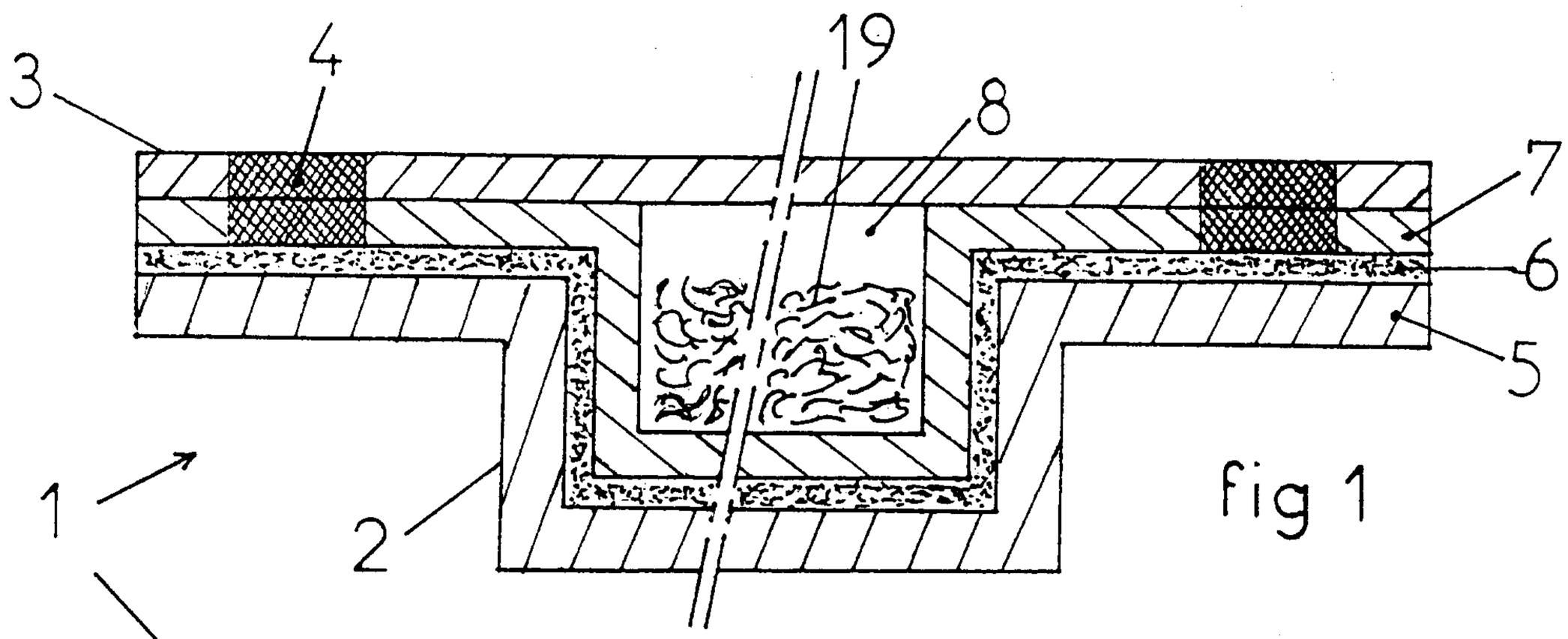


fig 1

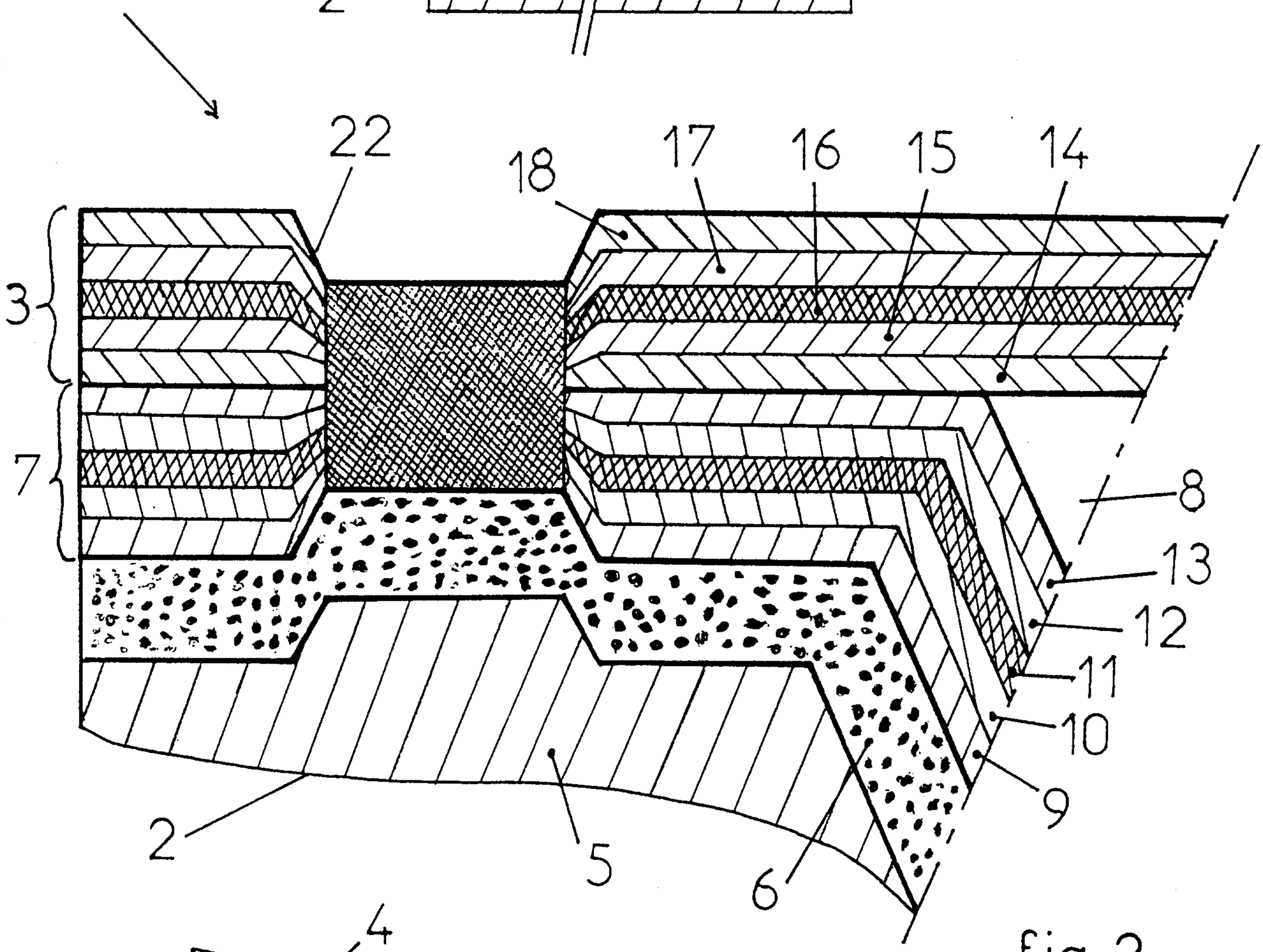


fig 2

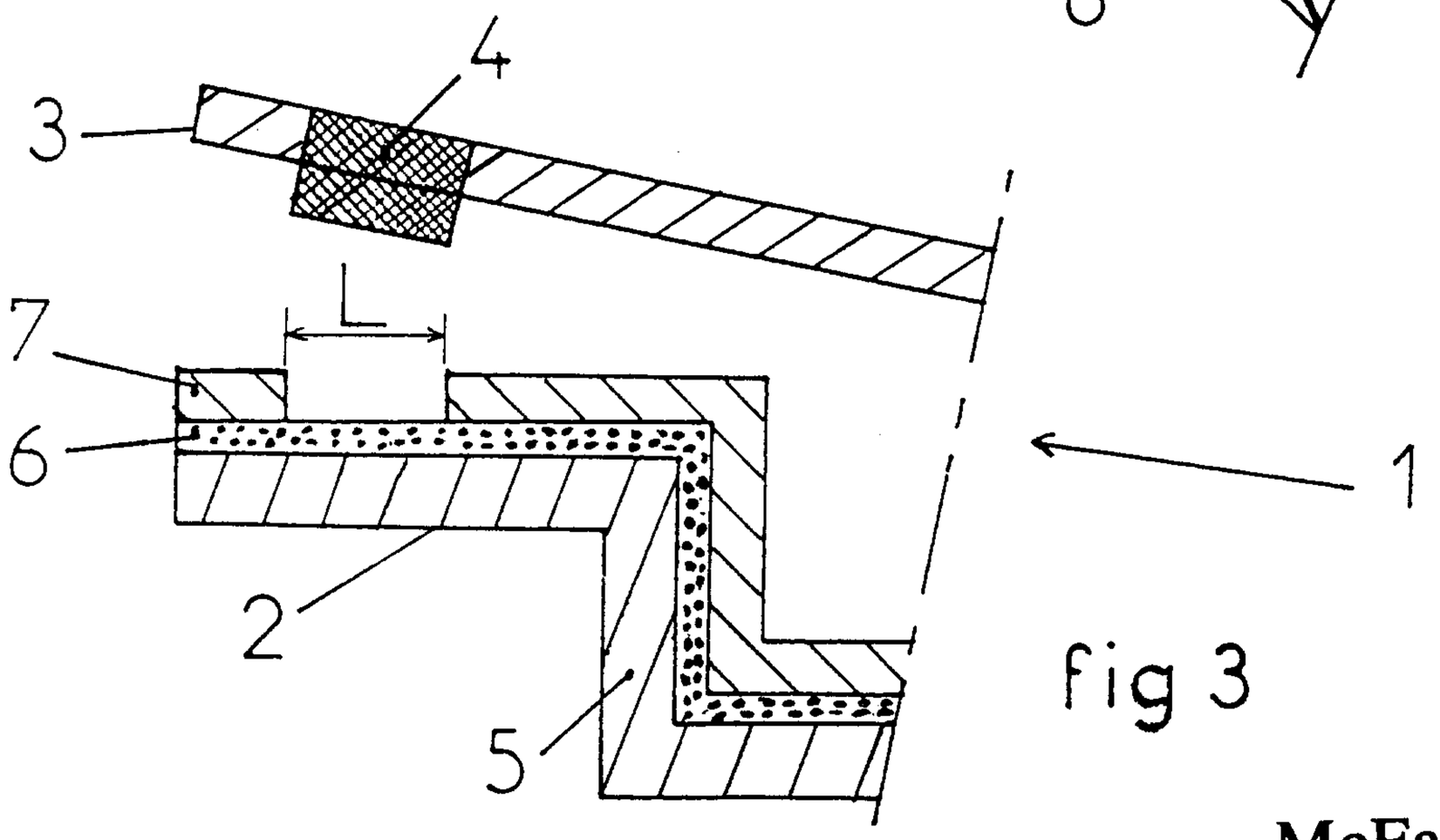


fig 3

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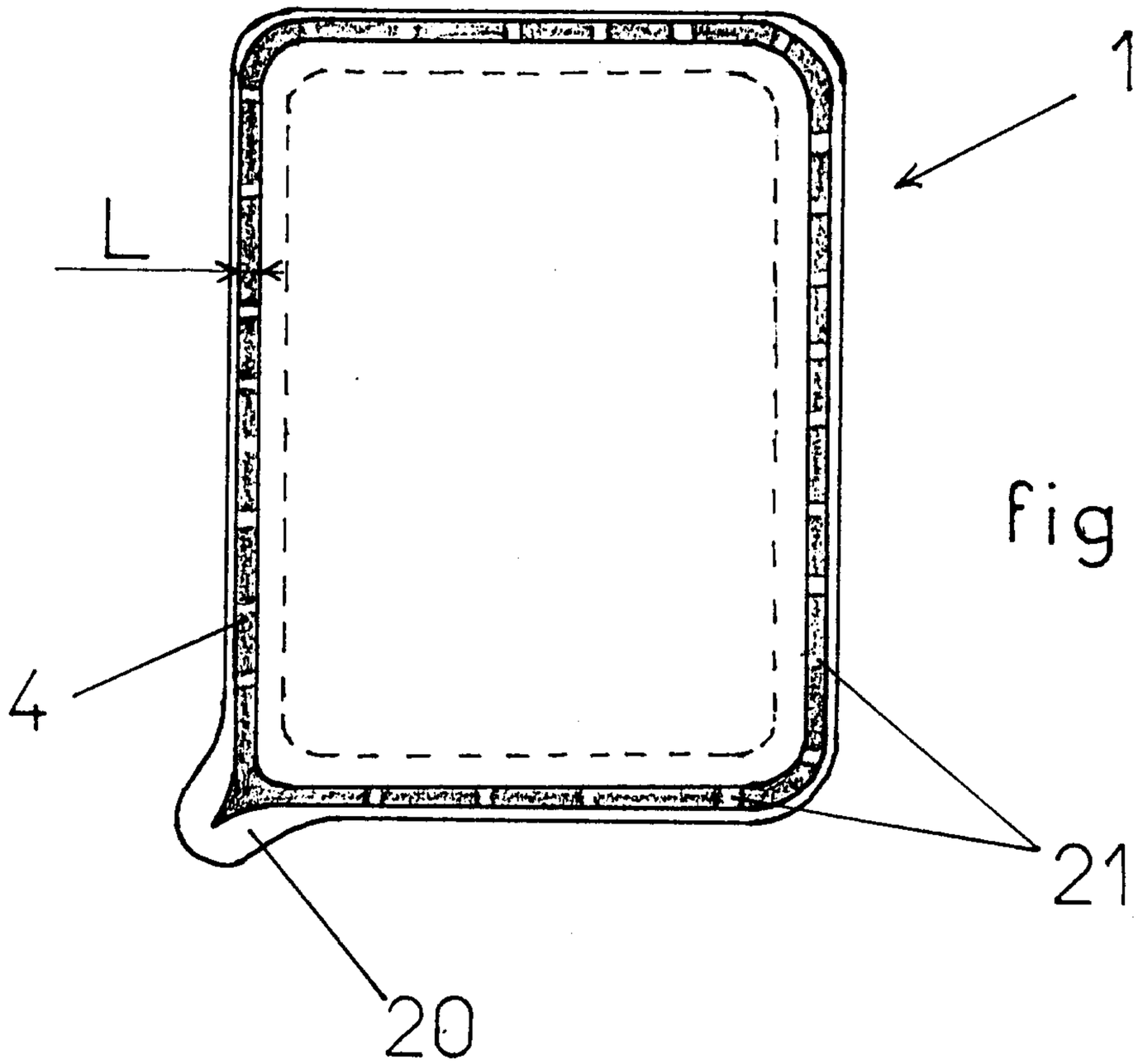

fig 4