(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 410 687 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.08.2024 Bulletin 2024/32

(21) Application number: **24152964.3**

(22) Date of filing: **19.01.2024**

(51) International Patent Classification (IPC):
B65B 7/16 *(2006.01)* ***B65B 11/52*** *(2006.01)*
B65B 31/02 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65B 11/52; B65B 7/164; B65B 31/025

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **20.01.2023 IT 202300000867**

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(54) METHOD AND APPARATUS FOR PACKAGING AT LEAST ONE PRODUCT AND RELATIVE PACKAGING

(57) Method and apparatus for packaging at least one product (P) arranged on a support (1) which has one or more lateral walls (3) and has no flanges connected to the upper edge of the one or more lateral walls (3), wherein the method comprises the following steps: provide a sheet of barrier film (4) with plan dimensions equal to or smaller than those of the base wall (2) of the support (1), feed the sheet of barrier film (4) to an attachment head (5), using the attachment head (5) place the sheet of barrier film (4) above said product (P) and the base wall (2), and hermetically attach, by means of the attachment head (5), the sheet of barrier film (4) onto only the base wall (2) around the product (P).

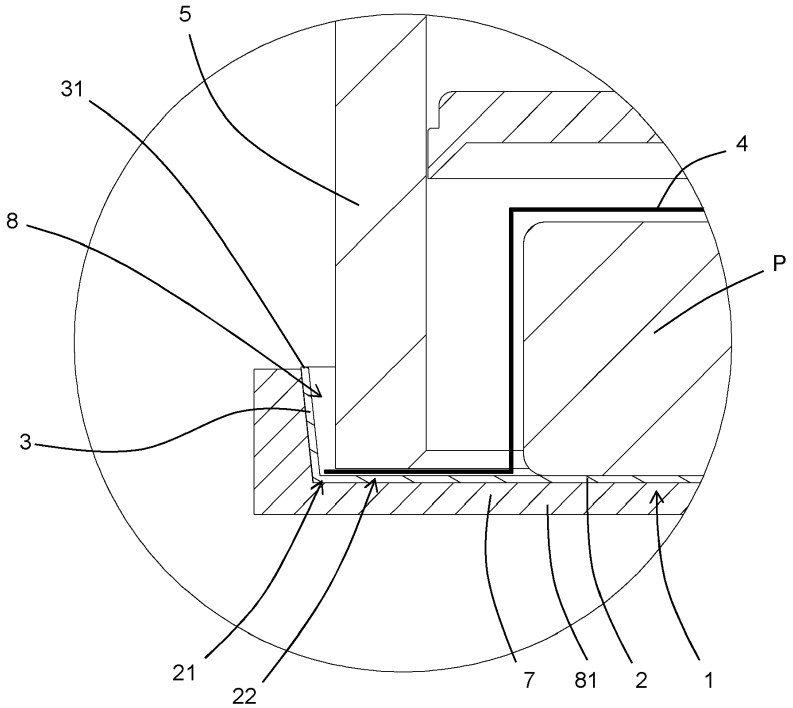

FIG. 3

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Description

[0001] This invention relates to a method for packaging at least one product and is advantageously applied in the case of food products.

[0002] This invention also relates to an apparatus for packaging at least one product. This invention also relates to a packaging containing at least one product, advantageously a food product.

[0003] Preferably, the packaging disclosed by this invention relates to the covering, using a packaging material (also interchangeably defined hereinafter as a sheet of barrier film), of at least one product arranged on a support, where the support comprises a base wall and at least one lateral wall extending upward from a perimeter edge of the base wall to delimit with it a housing in which the product is at least partially inserted.

[0004] As is known, in recent years technological development in the food product packaging sector has tended towards developing methods and/or apparatuses designed to produce packaging which guarantees the product a long shelf life (in which the packaging material acts as a barrier against the outside atmosphere), which allows optimum visibility of the product arranged on the support and which reduces the quantities of packaging material necessary (by eliminating or reducing waste packaging material).

[0005] Notice should be taken, for example, of methods for packaging at least one product, in which the support comprises lateral walls which have a flange, extending outwards, at the upper edge. The packaging material is applied to the support at the flanges and is in contact with part of the outer surface of the product.

[0006] Those methods have several disadvantages.

[0007] However the main disadvantage is the fact that such methods require the use of relatively large quantities of packaging material.

[0008] There are also prior art methods for packaging at least one product, in which the support comprises only a flat base wall, without any lateral walls. The packaging material is applied at the base wall.

[0009] Such methods have the disadvantage of not being able to guarantee effective protection of the packaged product from possible lateral impacts, as well as negatively affecting the ease of handling of the packaged product and the possibility of neatly arranging the packagings on shop counters.

[0010] The technical purpose of this invention is to provide a method and an apparatus for packaging at least one provide which overcome at least some of the disadvantages discussed above.

[0011] In particular, the aim of this invention is to provide a method for packaging at least one product which guarantees effective protection of the packaged product from possible lateral impacts and which guarantees ease of handling of the packaged product, at the same time requiring smaller quantities of packaging material than the prior art methods.

[0012] Moreover, another aim of this invention is to provide an apparatus for packaging at least one product which allows a packaging to be made which guarantees effective protection of the packaged product from possible lateral impacts and which guarantees ease of handling of the packaged product, at the same time using smaller quantities of packaging material than the prior art apparatuses.

[0013] Moreover, the aim of this invention is to provide a packaging containing at least one product which guarantees effective protection of the packaged product from possible lateral impacts, which guarantees ease of handling of the packaged product but which comprises smaller quantities of packaging material than the similar packaging currently on the market.

[0014] The technical purpose specified and the aims indicated are substantially achieved by a method and an apparatus for packaging at least one product and by a packaging containing at least one product, as described in the appended independent claims. Particular embodiments of this invention are defined in the corresponding dependent claims.

[0015] For a better understanding of this invention there follows a description of a preferred embodiment, provided by way of example only and which is nonlimiting, with reference to the accompanying drawings, in which:

- Figure 1 is a vertical cross-section of an apparatus according to this invention at the moment of finishing making the container, sectioned according to the line I-I of Figure 2;
- Figure 2 shows the apparatus of Figure 1 sectioned according to the line II-II;
- Figure 3 is an enlarged view of the detail III of Figure 2;
- Figure 4 shows the apparatus of Figure 1 sectioned according to the line IV-IV (without a lower body of the apparatus);
- Figure 5 is an axonometric view of a support usable in the context of this invention;
- Figure 6 schematically shows a first step of the method according to this invention;
- Figure 7 schematically shows a second step of the method according to this invention;
- Figure 8 schematically shows a third step of the method according to this invention;
- Figure 9 schematically shows a fourth step of the method according to this invention;
- Figure 10 schematically shows a fifth step of the method according to this invention;
- Figure 11 schematically shows a sixth step of the method according to this invention;
- Figure 12 is an enlarged view of a detail of Figure 10;
- Figure 13 is an enlarged view of a detail of Figure 11;
- Figure 14 schematically shows a seventh step of the method according to this invention;
- Figure 15 schematically shows an eighth step of the method according to this invention;

- Figure 16 is an enlarged view of a detail of Figure 14; and
- Figure 17 is an enlarged view of a detail of Figure 15.

[0016] Hereinafter there is a description first of the packaging method according to this invention and, following that, first of the apparatus and then of the packaging. Since the apparatus is configured to carry out the method, what is described with reference, respectively, to the method and to the apparatus, shall also be understood to apply, respectively, to the apparatus and to the method, if technically applicable.

[0017] The method for packaging at least one product P according to this invention involves the use of a support 1 comprising a base wall 2 and one or more lateral walls 3. Each lateral wall 3 extends upward from a perimeter edge 21 of the base wall 2. Preferably there are lateral walls along the whole perimeter edge 21 of the base wall 2 and preferably the lateral walls are constrained to each other to form a continuous ring above the perimeter edge 21. The lateral walls 3 and the base wall 2 jointly delimit a housing 8 in which the product P is at least partially inserted. Advantageously the lateral walls have no upper flange as can be seen in Figure 5 and they end with a free upper edge 31.

[0018] If the product P is not already positioned on the base wall 2 and in the housing 8, the method may comprise a preliminary positioning step, during which the product P is positioned on the base wall 2, in such a way that it is at least partially inside the housing 8 (as can be seen in Figures 1 to 4). The positioning step is carried out by resting the product P at a central area of the base wall 2 (that covered by the product P in Figure 4) and in such a way that that central area is surrounded by an annular area 22 of the base wall 2 on which the product P is not present. That arrangement of the product P on the base wall 2 (with a free annular area 22) must be complied with even if the product P is already positioned on the support 1.

[0019] The packaging method according to this invention comprises a step of providing at least one sheet of barrier film 4 (that is to say, a packaging material). Advantageously the sheet of barrier film 4 is provided with plan dimensions equal to or smaller than those of the support, preferably equal to or smaller than those of the base wall 2. In some embodiments the dimensions may even be slightly greater than those of the base wall 2, for example less than 5 mm greater, preferably less than 2 mm greater.

[0020] The packaging method according to this invention also comprises a step of feeding the at least one sheet of barrier film 4 to at least one respective attachment head 5.

[0021] The method also comprises a step of hermetically attaching, by means of the at least one attachment head 5, the at least one sheet of barrier film 4 onto only the base wall 2 of the support 1 (that is to say, not onto the lateral walls 3). The attaching is also carried out around the at least one product P.

[0022] In particular, as illustrated for example in Figures 7 to 10, the packaging method according to this invention, which in general involves feeding at least one sheet of barrier film 4 with the required dimensions to at least one respective attachment head 5, in some embodiments, with parallel packaging of a plurality of products P arranged on respective supports 1, involves feeding a plurality of sheets of barrier film 4 to a corresponding plurality of attachment heads 5, the number of the latter advantageously being the same as the number of sheets of barrier film 4 fed. Once each attachment head 5 has been fed with a respective sheet of barrier film 4, each attachment head 5 hermetically attaches, independently of any other attachment heads 5 which may be present or simultaneously with them, the relative sheet of barrier film 4 around the relative product P and onto only the base wall 2 of the relative support 1.

[0023] As indicated, compared with prior art packaging methods, the method according to this invention allows the use of smaller quantities of packaging material, since the packaging material is not applied at the flanges (therefore flanges may not be present, thereby saving material in the support 1) and at parts of the lateral walls 3, but only at the base wall 2. It is therefore possible to use sheets of barrier film 4 which are smaller than in the prior art, saving material. At the same time, a further advantage deriving from the method according to this invention, due to the presence of the lateral walls 3, is the ability to guarantee effective protection of the packaged product P from possible lateral impacts, as well as to make handling of the packaged product P easier.

[0024] According to a further aspect of the invention, the step of attaching the at least one sheet of barrier film 4 comprises the sub-steps of heat-softening the sheet of barrier film 4 and creating a negative pressure between the at least one sheet of barrier film 4 and the support 1.

[0025] In particular, the sub-step of heat-softening is preferably carried out using a heating element (not illustrated) for each attachment head 5, for example an electric heating element, and the sub-step of creating a negative pressure is preferably carried out using, for example, a dedicated pneumatic circuit or a suction device.

[0026] According to one embodiment, the sub-step of creating a negative pressure is intended to form the sheet of barrier film 4 in such a way as to make it at least partially adhere to the support 1 and to the product P.

[0027] According to a further embodiment, the sub-step of creating a negative pressure may be accompanied by a sub-step of creating an overpressure (using a dedicated fluid circuit) at a surface of the at least one sheet of barrier film 4 (hereinafter also referred to as the outer side of the sheet) directed the opposite way to the surface directed towards the product P (hereinafter also referred to as the product side of the sheet). In this way, it is possible to obtain a more effective application of the sheet of barrier film 4 to the support 1 and on the product P.

[0028] According to a further aspect of the invention, as shown in Figure 10 and 11, after the sub-step of heat-softening the at least one sheet of barrier film 4, and before the sub-step of creating the negative pressure, the method comprises a step of forming the at least one sheet of barrier film 4 according to a substantially concave shape developing away from the support 1.

[0029] In particular, the step of forming the sheet of barrier film 4 according to a substantially concave shape developing away from the support 1 occurs after the sub-step of heat-softening the sheet of barrier film 4, in such a way that the sheet of barrier film 4 is in a more workable state for efficient forming, which preferably occurs by means of a mould 10 for each attachment head 5. Moreover, the step of forming the sheet of barrier film 4 occurs before the sub-step of creating the negative pressure, since in order to be able to deform the sheet of barrier film 4 according to said substantially concave shape, it is necessary for the pressure on the product side to be greater than that on the outer side of the sheet.

[0030] The step of forming the sheet of barrier film 4 allows the sheet of barrier film 4 to be shaped in such a way that it can be attached to the base wall 2, around the product P, without initially making contact with the product P.

[0031] According to a further aspect of the invention, in some embodiments the method for packaging the at least one product P arranged on the support 1 executes a skin packaging.

[0032] In particular, as is known, skin packaging involves hermetically applying the sheet of barrier film 4 above the product P and to part of the base wall 2 of the support 1, for packaging in which the sheet of barrier film 4 has a protective function for the product P similar to a skin, creating an anaerobic condition which prevents an increase in bacterial load, harmful to the integrity, shelf life and organoleptic properties of the product P. For example, for this type of packaging of a meat product, the shelf life may be up to 15 days after the date the product P was packaged.

[0033] According to a different embodiment of this invention, in which the method for packaging the product P does not execute a skin packaging, but instead packaging in a modified atmosphere.

[0034] In this case, after the sub-step of applying a negative pressure (between the sheet of barrier film 4 and the support 1), the method comprises a step of feeding at least one inert gas at the space delimited by the sheet of barrier film 4 and by the support 1, inside which the product P is also located (that space in general may also be delimited by parts of the apparatus used to carry out the method).

[0035] The step of feeding at least one inert gas occurs after the sub-step of applying a negative pressure, which is carried out in such a way as to substantially create a vacuum in the space in which the product P is located; in this way, the inert gas environment which is created in contact with the product P at the end of the step of feeding at least one inert gas, and which remains contained between the sheet of barrier film 4 and the base wall 2, is capable of guaranteeing a long product P shelf life, as well as preserving product integrity and properties (due to the absence of oxygen and the presence of at least one inert gas designed to preserve the product P).

[0036] It should be noticed that in the case just described, the sub-step of applying a negative pressure is advantageously carried out in such a way as to create a negative pressure not just at the product side of the sheet of barrier film 4, but also at the outer side, to prevent a pressure difference between the two sides from causing a premature deformation of the sheet of barrier film 4 towards the product P as occurs, in contrast, in the case of skin packaging.

[0037] Packaging in a modified atmosphere, an alternative to skin packaging, involves the presence of at least one inert gas (for example, nitrogen and carbon dioxide) in the space in which the product P is located and which is contained between the sheet of barrier film 4 and the base wall 2. In this case, the sheet of barrier film 4 contains the product P but not in such a way that it completely adheres to the exposed surface of the product P (it might not even adhere at all). Moreover, the inert gas is inserted with a concentration and/or a composition which are such that they inhibit an increase in bacterial loads which might compromise the integrity, shelf life and organoleptic properties of the product P; for example, if the product P is meat, the shelf life of the product P may be up to approximately 8 days after the date of the product P itself was packaged.

[0038] According to a further aspect of the invention, the step of attaching the at least one sheet of barrier film 4 also advantageously comprises the sub-step of pressing said at least one sheet of barrier film 4 against said base wall 2 at the annular area 22 which surrounds the central area of the base wall 2 (the area in contact with the product P).

[0039] In particular, as can be seen in Figures 1 to 4, the sub-step of pressing the sheet of barrier film 4 preferably occurs by means of the respective attachment head 5. The sub-step of pressing the at least one sheet of barrier film 4, consists of mechanically pushing down the sheet of barrier film 4 against a portion of the base wall 2 extending around the product P. In other words, pushing down of the sheet of barrier film 4 advantageously occurs annularly against a portion of base wall 2 located in the annular area 22.

[0040] Depending on the embodiments, the sub-step of pressing the sheet of barrier film 4 may occur either before the sub-step of creating a negative pressure (in particular in the case of skin packaging in which the step of creating the negative pressure is carried out by piercing the support), or after it (for example in the case of packaging in a modified atmosphere in which the negative pressure step does not cause the sheet of barrier film 4 to adhere, but only causes creation of the vacuum, or in the case of skin packaging which does not involve pierc-

ing of the support).

[0041] According to a further aspect of the invention, in some embodiments the step of feeding the at least one sheet of barrier film 4 comprises a sub-step of conveying the at least one sheet of barrier film 4 by means of at least one conveyor 6 which is movable between a position apart from the attachment head 5 and a position near to the attachment head 5. In more detail, the sub-step of conveying the barrier film 4, involves feeding the sheet of barrier film 4 to the conveyor 6 when the conveyor 6 is in the apart position, then conveying the sheet of barrier film 4 from the apart position to the near position by moving the conveyor 6 accordingly, and finally transferring the sheet of barrier film 4 from the conveyor to the attachment head 5 when the conveyor 6 is in the near position.

[0042] In a preferred embodiment, as illustrated for example in Figures 9 and 10, the sub-step of conveying the sheet of barrier film 4 occurs by means of at least one conveyor 6 formed by a carriage (also referred to as a shuttle), which is movable between the position apart from the attachment head 5 and the position near to the attachment head 5. If there are multiple attachment heads 5 present, there may be a single conveyor 6 for all of the attachment heads 5 or there may be a conveyor for each attachment head 5. Movement of each conveyor 6 occurs by means of a motor drive system, which may be dedicated to each attachment head 5 or be shared by all of the attachment heads 5. The motor drive system of each conveyor 6 is configured to guarantee the feeding (synchronous or alternating) of a sheet of barrier film 4 to a respective attachment head 5 which has no sheet, taking into account the time which elapses between one hermetic application and the next of the sheet of barrier film 4 on the products P. Since the feeding of sheets to attachment heads using conveyors is in itself known to experts in the sector, the relative details will not be described.

[0043] According to a further aspect of the invention, the step of providing at least one sheet of barrier film 4 comprises a sub-step of cutting the sheet of barrier film 4 from at least one continuous barrier film or from a barrier film with plan dimensions greater than those required for the sheet of barrier film 4.

[0044] In particular, as illustrated for example in Figures 8 and 9, the sub-step of cutting at least one continuous barrier film or one with dimensions greater than those required for the sheet 4, is carried out by means of a cutting system 12. In detail, the cutting system 12 may be synchronised with each motor drive system of the at least one conveyor 6, in such a way that present on each conveyor 6 there is a sheet of barrier film 4 with the required dimensions (as illustrated in Figure 8). Moreover, the cutting system 12 may be synchronised with a device for unwinding the continuous sheet of barrier film, arranged upstream of the cutting system 12 and designed to unwind the continuous sheet of barrier film from a reel 11 (as schematically illustrated in Figure 7). In some embodiments the cutting system 12 may in contrast be associated with the attachment head 5.

[0045] According to a different aspect of the invention the at least one sheet of barrier film 4 is in contrast in the form of at least one pre-cut film.

[0046] In particular, use of a sheet of barrier film 4 in the form of at least one pre-cut film makes it possible to avoid the presence of the relative cutting system 12 and in that case the unwinding device.

[0047] According to a further aspect of the invention, the at least one sheet of barrier film 4 is made of a material comprising at least one polymeric material selected from the following group: polyolefins, preferably polyethylene; ionomers; polyesters, preferably polyethylene terephthalate; EVOH.

[0048] According to a further aspect of the invention, the support 1 is made of a material comprising at least one material selected from the following group: cellulosic material, preferably paper or cardboard; polymeric material; EVOH. Advantageously, the support 1 may be made of a multi-layer material in which a layer of polymeric material intended to be put in contact with the product P is coupled to an outer layer of cellulosic material. Advantageously, both the support 1, and the sheet of barrier film comprise a layer of material which is a barrier to oxygen.

[0049] According to a further aspect, the invention relates to the apparatus for packaging the product P arranged on the support 1.

[0050] The apparatus comprises at least one attachment head 5 designed to receive at least one respective sheet of barrier film 4, and at least one lower body 7 a housing 8 configured to house a respective support 1, the housing 8 being delimited at the bottom by a bottom wall 81.

[0051] Preferably, the attachment head 5 is configured to interact flush against the lower body 7 at the bottom wall 81 of the housing 8, to hermetically attach the sheet of barrier film 4 onto only the base wall 2, around the at least one product P.

[0052] In more detail, the attachment head 5 has an operative frame 51 and interacts flush against the lower body 7 by means of the operative frame 51. Advantageously, the operative frame 51 interacts with an annular portion of the bottom wall 81 of the housing 8 (in use corresponding to the annular area 22 of the base wall 2).

[0053] The apparatus according to this invention allows the use of smaller quantities of packaging material (and consequently smaller quantities of waste) than prior art apparatuses, since the packaging material is not applied at flanges (there being none present) and at part of the lateral walls 3, but only at the base wall 2.

[0054] According to a further aspect of this invention, the apparatus comprises at least one movable conveyor 6, configured to convey the sheet of barrier film 4 to the at least one attachment head 5.

[0055] According to a further aspect of this invention, the at least one attachment head 5 of said apparatus

includes a heat-sealing head.

[0056] In particular, the heat-sealing head is designed to heat seal the sheet of barrier film 4 at the annular area 22 of the base wall 2.

[0057] Alternatively to the heat-sealing head, and according to a further preferred embodiment, the attachment head 5 comprises an ultrasonic sealing system (not illustrated) designed to use ultrasound to seal the sheet of barrier film 4 to the base wall 2 around the product P.

[0058] According to a further aspect of this invention, the apparatus 1 comprises a heating element and a mould 10 associated with the attachment head 5, and the attachment head 5 is designed to impart a predetermined shape on the at least one sheet of barrier film 4 by means of the mould 10.

[0059] In particular, the heating element and the mould 10 (Figures 13 and 16) of the attachment head 5 operate synergically to form the sheet of barrier film 4 according to a predetermined shape which is substantially concave and which develops away from the support 1. In detail, the heating element is designed to heat-soften the sheet of barrier film 4, in such a way as to render it more workable. After the sheet of barrier film 4 has been softened, the mould 10 which also has a concave shape, in synergy with a pneumatic circuit configured to suck the sheet of barrier film 4 towards the inside of the mould 10, forms the sheet of barrier film 4 according to the predetermined shape.

[0060] Depending on the embodiments, the heating element (which may advantageously be used for the entire heating of the sheet of barrier film 4) may be associated either with the attachment head 5 or with the conveyor 6. Figures 6 to 17 schematically show the main operating steps of an apparatus 1 made in accordance with this invention as well as a corresponding embodiment of the method, in which three packagings can be made simultaneously.

[0061] Figure 6 shows the initial step in which three supports 1 loaded with respective products P are inserted inside three housings 8 made in the lower body 7. Then, a continuous barrier film is unwound from a reel 11 and brought above three conveyors 6 (Figure 7). The cutting system 12 is then activated (Figure 8) to obtain three sheets of barrier film 4 each positioned above the relative conveyor (Figure 9). After having activated a relative retaining system (advantageously using suction) for each conveyor 6, the conveyors 6 are brought into the respective near positions in which each is facing the relative attachment head 5 (Figure 10). In this step the conveyors 6 may even be spaced apart from each other as illustrated in the appended figures.

[0062] Each attachment head 5 is then coupled to the relative conveyor 6 and, by means of switching of the relative suction systems, the sheets of barrier film 4 are transferred to the attachment heads 5. If the sheets 4 have not already been heated by a heating element associated with the conveyors 6, a heating element associated with the attachment heads 5 may be activated to soften the sheets 4. At that point the sheets of protective film 4 may be sucked into the mould 10 (Figure 11) until they have been made to adopt the desired shape (Figure 14). In the meantime, the conveyors are advantageously returned to the apart position so that they are ready for a new cycle (Figure 14).

[0063] Then the attachment heads 5 are coupled to the lower bodies 7 and press the sheets of barrier film 4 against the annular area 22 of the base wall 2 of each support, attaching them to each support.

[0064] In the case illustrated in the appended figures the packaging method executes a skin packaging and, then, in the last step shown a pressure difference is created between the product side and the outer side of each sheet of barrier film 4, sufficient to cause it to adhere both to the base wall 2 and to the product P (Figure 15).

[0065] According to a further aspect, as indicated, the invention relates to the packaging which contains the product P arranged on the support 1.

[0066] The packaging comprises the support 1, the at least one product P arranged on the support 1 and at least one sheet of barrier film 4 positioned above the product P and attached to the support 1.

[0067] The support 1 comprises a base wall 2 and one or more lateral walls 3 extending upward from a perimeter edge 21 of the base wall 2, the one or more lateral walls 3 and the base wall 2 jointly delimiting a housing 8 in which the product P is at least partially inserted.

[0068] According to a preferred embodiment, the sheet of barrier film 4 has plan dimensions equal to or smaller than those of the support 1, but preferably equal to or smaller than those of the base wall 2 (as indicated above they may even be slightly greater than the latter).

[0069] The sheet of barrier film 4 is hermetically attached onto only the base wall 2 around the product P, in particular at the annular area 22.

[0070] According to a further aspect of this invention, the one or more lateral walls 3 have an upper edge defining the plan dimension of the support 1, and the support 1 has no flanges connected to the upper edge The term flange is intended to indicate any part of the support 1 which, from the upper edge, extends outwards from the support 1 itself (with at least one component developing parallel to a base plane of the support 1 itself)

[0071] Finally it is clear that the method and the apparatus for packaging at least one product, described and illustrated herein, may be modified and adapted without thereby departing from the scope of this invention, as set out in the appended claims.

[0072] All details may be substituted with other technically equivalent elements and the materials used, as well as the shapes and dimensions of the various components, may vary according to requirements.

Claims

1. A method for packaging at least one product (P) ar-

ranged on a support (1), wherein said support (1) comprises a base wall (2) and one or more lateral walls (3) which have no upper flange, which end with a free upper edge (31) and which extend upward from a perimeter edge (21) of the base wall (2), the one or more lateral walls (3) and the base wall (2) jointly delimiting a housing (8) in which the product (P) is at least partially inserted;
said method comprising the following steps:

- provide at least one sheet of barrier film (4) with plan dimensions equal to or smaller than those of said base wall (2);
- feed said at least one sheet of barrier film (4) to at least one respective attachment head (5);
- using said at least one attachment head (5), place said at least one sheet of barrier film (4) above said product (P) and said base wall (2);
- hermetically attach, by means of said at least one attachment head (5), said at least one sheet of barrier film (4) onto only the base wall (2) around said at least one product (P).

2. A method according to the preceding claim, wherein said step of attaching said at least one sheet of barrier film (4) comprises the sub-steps of heat-softening said sheet of barrier film (4) and creating a negative pressure between said at least one sheet of barrier film (4) and said support (1).

3. A method according to claim 2, wherein after the sub-step of heat-softening said at least one sheet of barrier film (4), and before the sub-step of creating the negative pressure, the method comprises a step of forming said at least one sheet of barrier film (4) according to a substantially concave shape developing away from said support (1).

4. A method according to one or more of claims 1 to 3, wherein the method for packaging said at least one product (P) arranged on said support (1) executes a skin packaging.

5. A method according to any one of claims 2 to 3, wherein after the sub-step of applying a negative pressure, the method comprises a step of feeding at least one inert gas at a space delimited by said at least one sheet of barrier film (4), said support (1) and said at least one product (P).

6. A method according to any one of claims 1 to 5, wherein said step of attaching said at least one sheet of barrier film (4) comprises the sub-step of pressing said at least one sheet of barrier film (4) against an annular area (22) of said base wall (2), which surrounds a central area of said base wall (2) where the central area is in contact with said at least one product (P)..

7. A method according to any one of claims 1 to 6, wherein the step of feeding said at least one sheet of barrier film (4) comprises a sub-step of conveying said at least one sheet of barrier film (4) by means of at least one conveyor (6) which is movable between a position apart from said attachment head (5) and a position near to said attachment head (5), feeding the sheet of barrier film (4) to the conveyor (6) when the conveyor (6) is in the apart position, conveying the sheet of barrier film (4) from the apart position to the near position by means of the conveyor (6) and transferring the sheet of barrier film (4) from the conveyor to the attachment head (5) when the conveyor (6) is in the near position.

8. A method according to any one of claims 1 to 7, wherein, alternatively:

said step of providing at least one sheet of barrier film (4) comprises a sub-step of cutting said at least one sheet of barrier film (4) from at least one barrier film that is continuous or of dimensions greater than the plan dimensions of said base wall (2); or
said at least one sheet of barrier film (4) is in the form of at least one pre-cut film.

9. A method according to any one of claims 1 to 8, wherein said at least one sheet of barrier film (4) is made of a material comprising at least one material selected from the following group: polyolefins, preferably polyethylene; ionomers; polyesters, preferably polyethylene terephthalate, EVOH and/or wherein the support (1) is made of a material comprising at least one material selected from the following group: cellulosic material, preferably paper or cardboard; polymeric material; EVOH.

10. An apparatus for packaging at least one product (P) arranged on a support (1), wherein said support (1) comprises a base wall (2) and one or more lateral walls (3) which have no upper flange, which end with a free upper edge (31) and which extend upward from a perimeter edge (21) of the base wall (2), the one or more lateral walls (3) and the base wall (2) jointly delimiting a housing (8) in which the product (P) is at least partially inserted;

said apparatus comprising:

- at least one attachment head (5) designed to receive at least one respective sheet of barrier film (4) having plan dimensions equal to or smaller than those of said base wall (2);
- at least one lower body (7) comprising a housing (8) configured to house a respective support (1), the housing (8) being de-

limited at the bottom by a bottom wall (81);

said at least one attachment head (5) being configured to interact flush against the lower body (7) at the bottom wall (81) of the housing (8), to hermetically attach in use said at least one sheet of barrier film (4) with plan dimensions equal to or smaller than those of said base wall (2), onto only the base wall of the support (2) around said at least one product (P).

11. An apparatus according to claim 10, comprising at least one conveyor (6) that is movable between a position apart from said attachment head (5) and a position near to said attachment head (5), the conveyor (6) being configured to convey said at least one sheet of barrier film (4) to the at least one attachment head (5)..

12. An apparatus according to claim 10 or 11, wherein said at least one attachment head (5) includes a heat-sealing head.

13. An apparatus according to one or more of claims 10 to 12, further comprising a heating element and a mould (10) associated with the attachment head (5), said mould (10) being concave and said attachment head (5) being further configured to impart a predetermined shape on said at least one sheet of barrier film (4) by means of said mould (10).

14. An apparatus according to one or more of claims 10 to 13, wherein said attachment head (5) has an operative frame (51) and wherein the attachment head (5) interacts flush against the lower body (7) by means of the operative frame (51) and at an annular portion of the bottom wall (81) of the housing (8).

15. Packaging comprising a support (1), at least one product (P) arranged on the support (1) and at least one sheet of barrier film (4) positioned above said product (P) and attached to the support (1), wherein said support (1) comprises a base wall (2) and one or more lateral walls (3) extending upward from a perimeter edge (21) of the base wall (2), the one or more lateral walls (3) and the base wall (2) jointly delimiting a housing (8) in which the product (P) is at least partially inserted, and wherein the sheet of barrier film (4) has plan dimensions equal to or smaller than those of said base wall (2), and is hermetically attached onto only the base wall (2) around said at least one product (P); wherein the one or more lateral walls (3) have an upper edge defining the plan dimension of the support (1), the support (1) having no flanges connected to said upper edge.

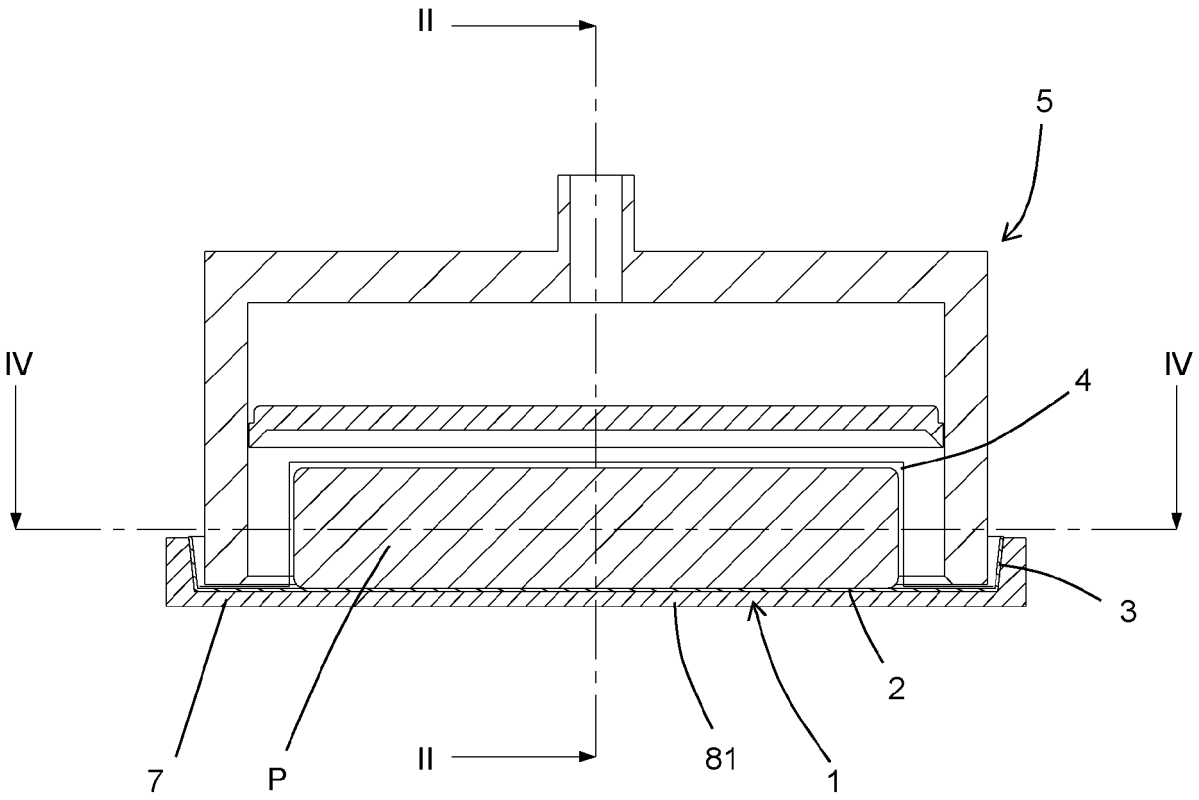

FIG. 1

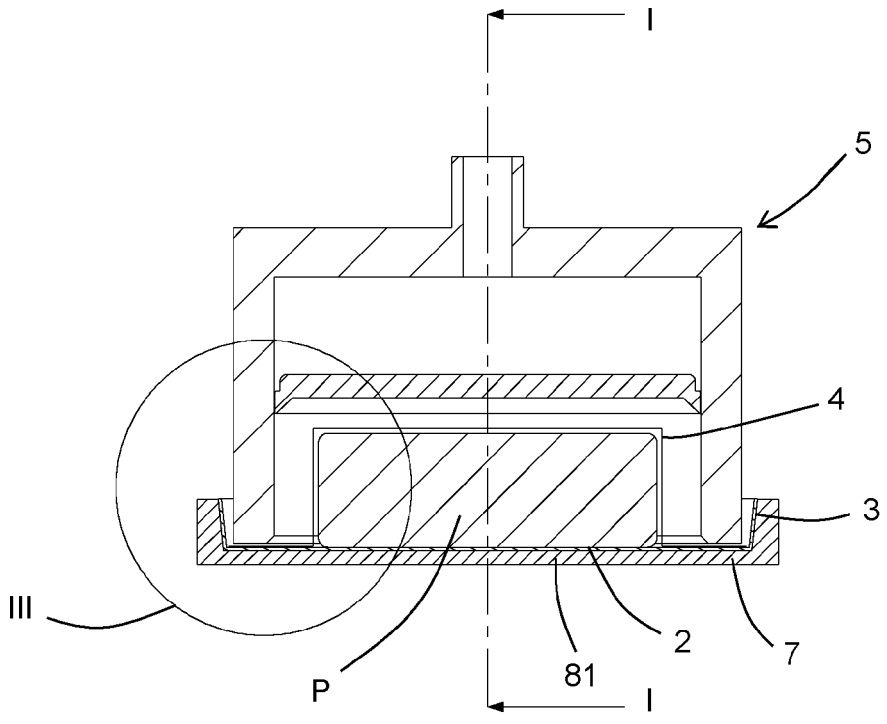

FIG. 2

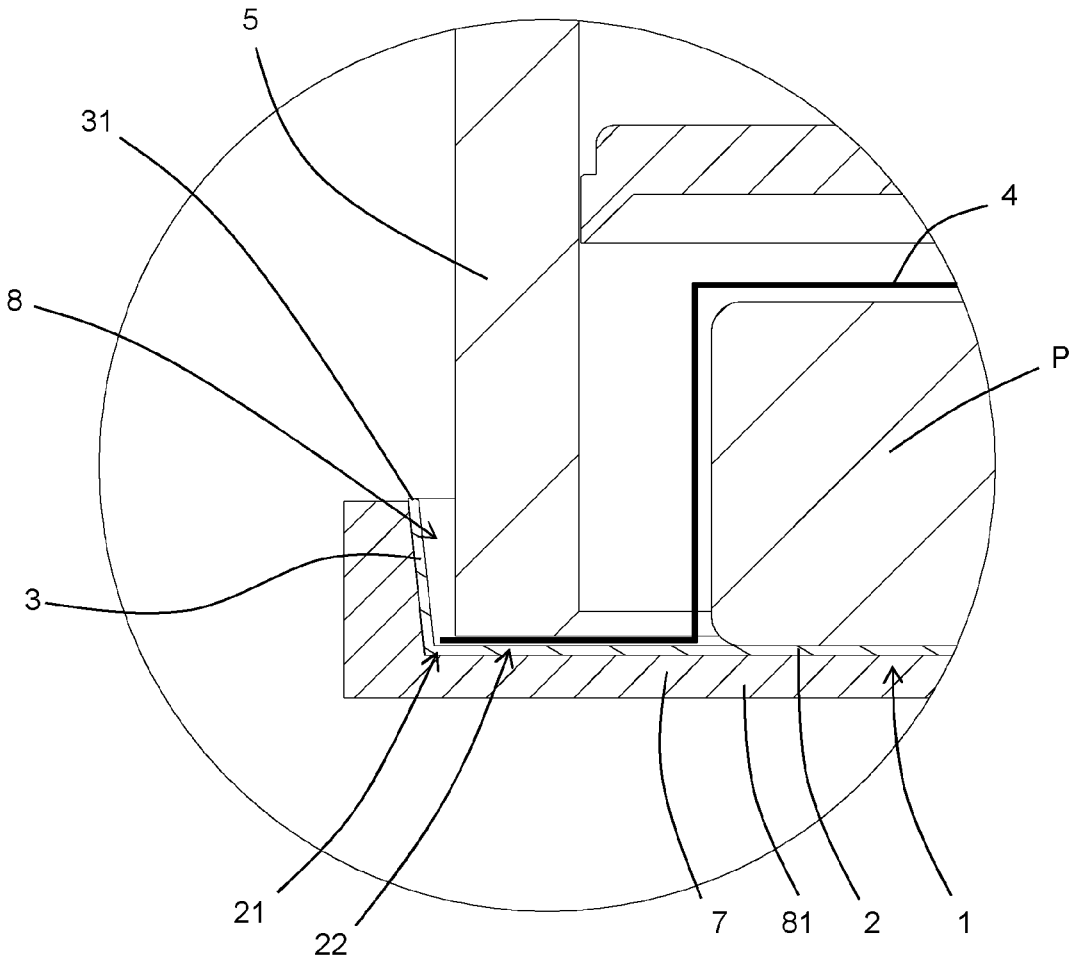

FIG. 3

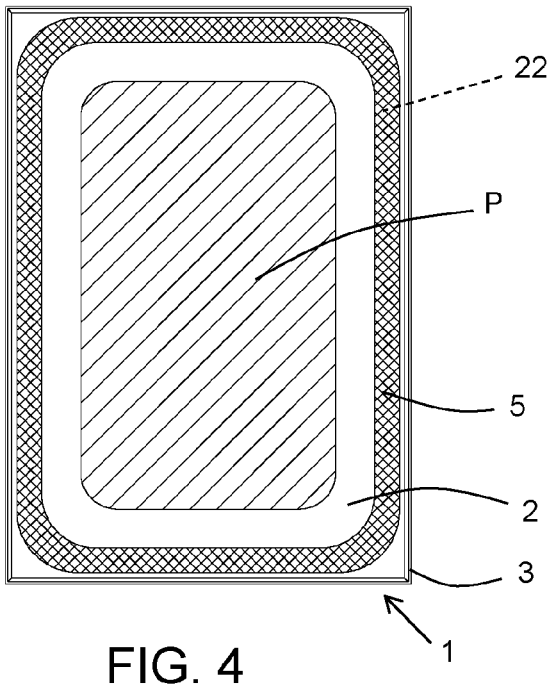

FIG. 4

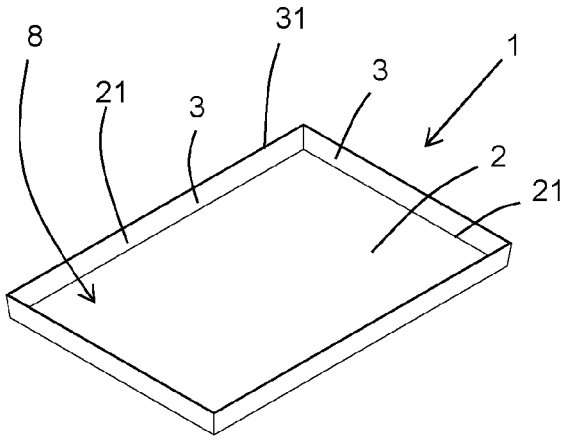

FIG. 5

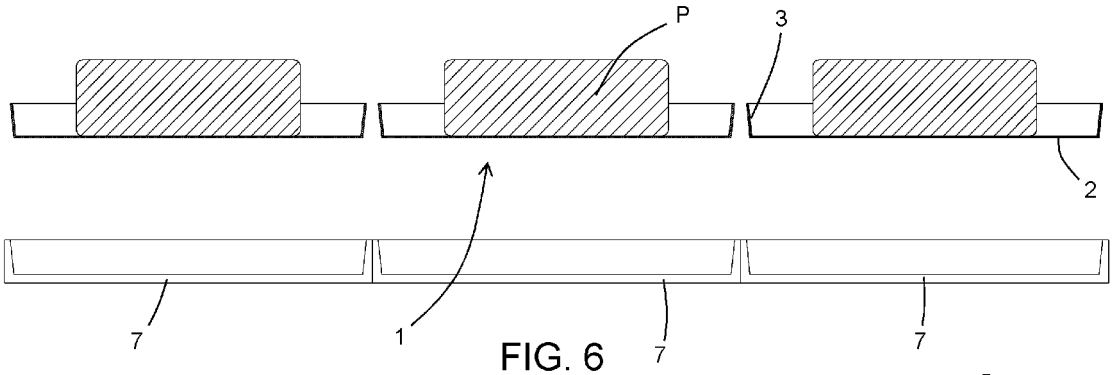

FIG. 6

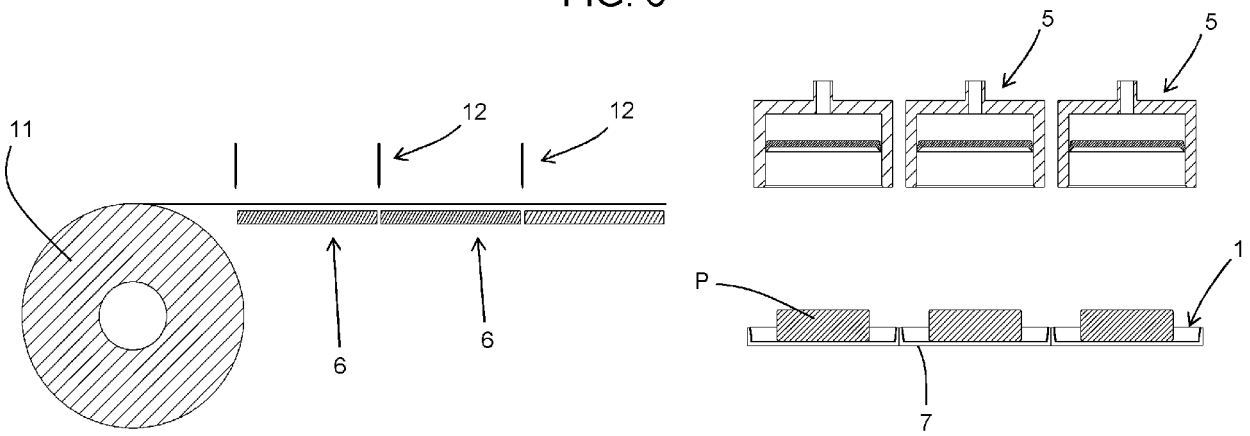

FIG. 7

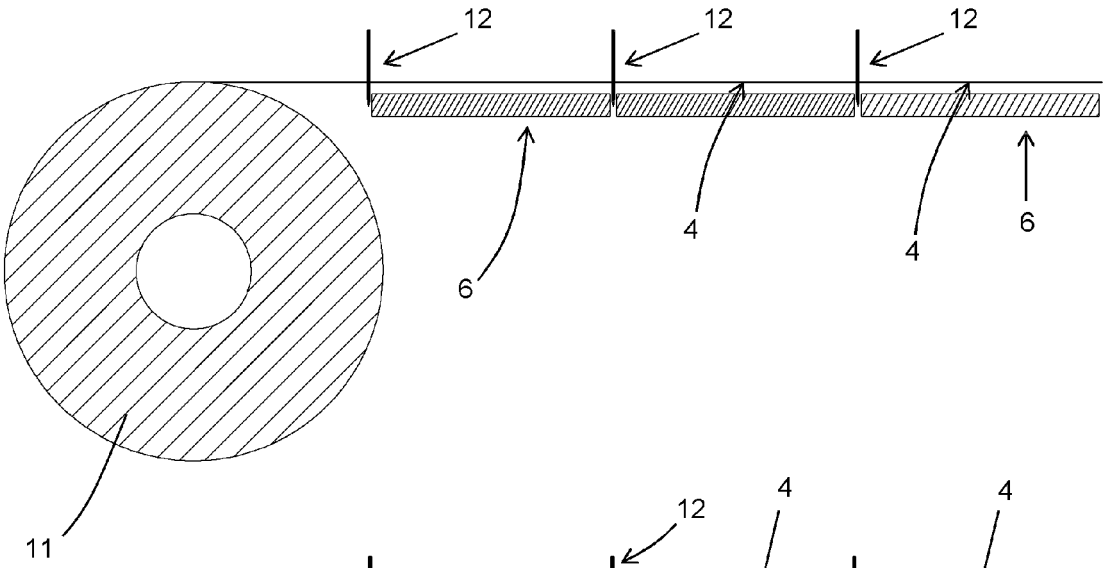

FIG. 8

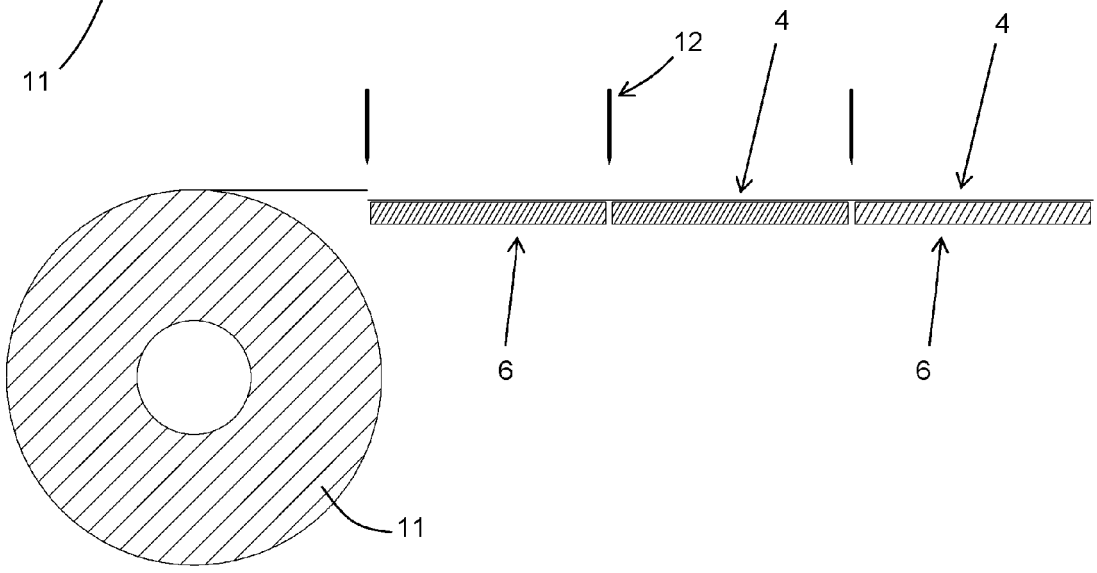

FIG. 9

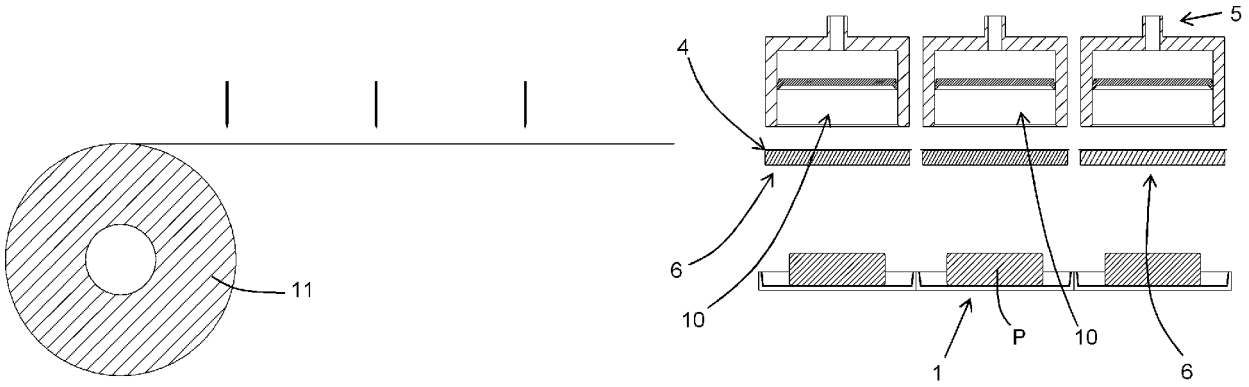

FIG. 10

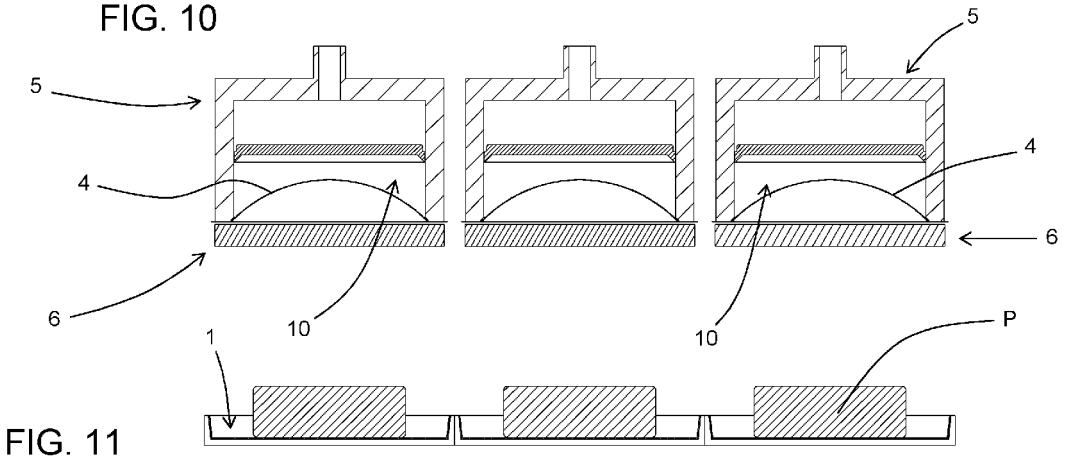

FIG. 11

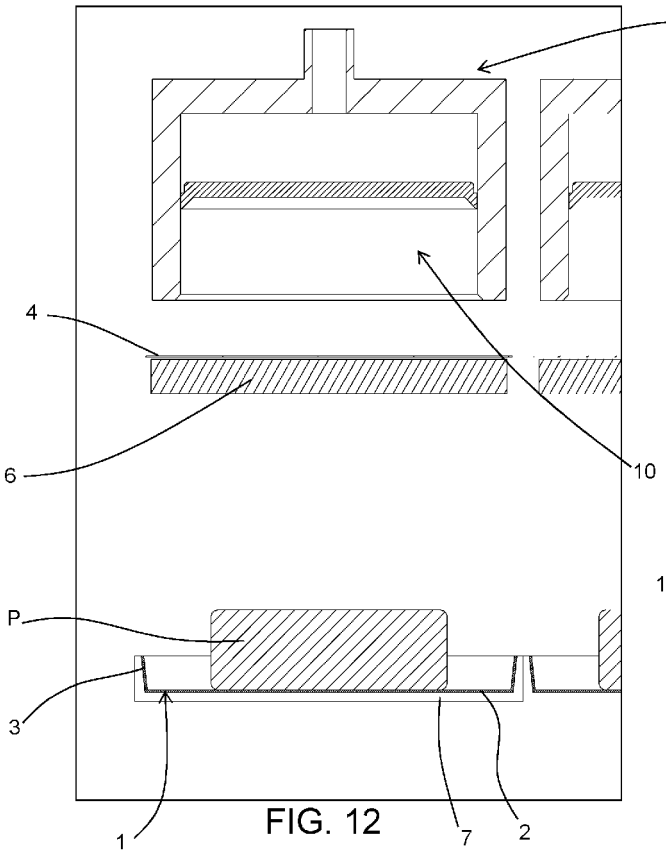

FIG. 12

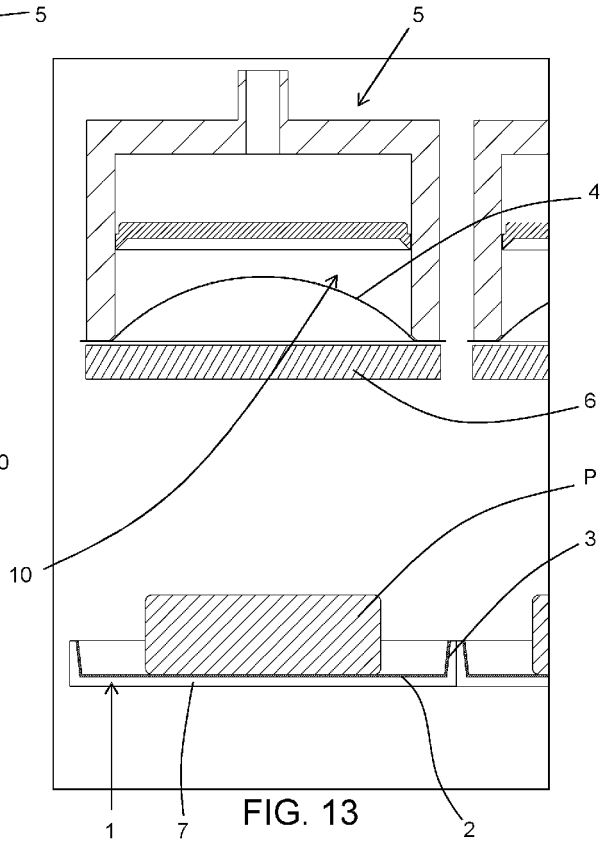

FIG. 13

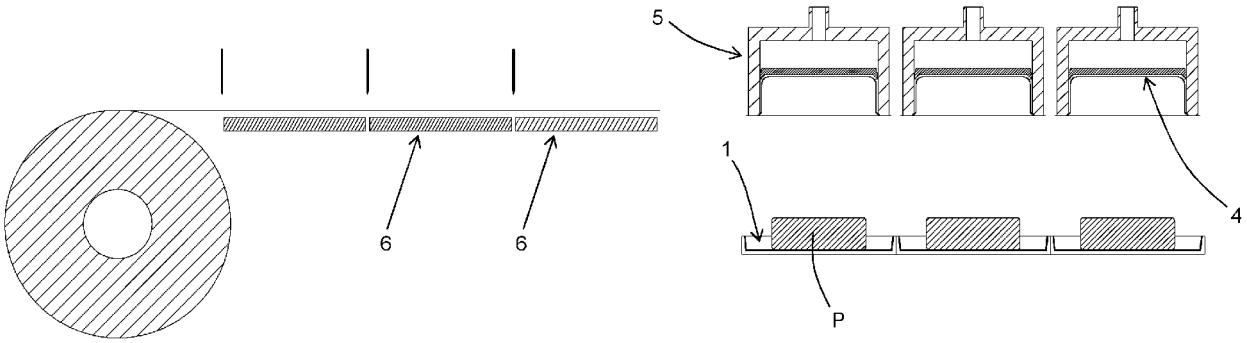

FIG. 14

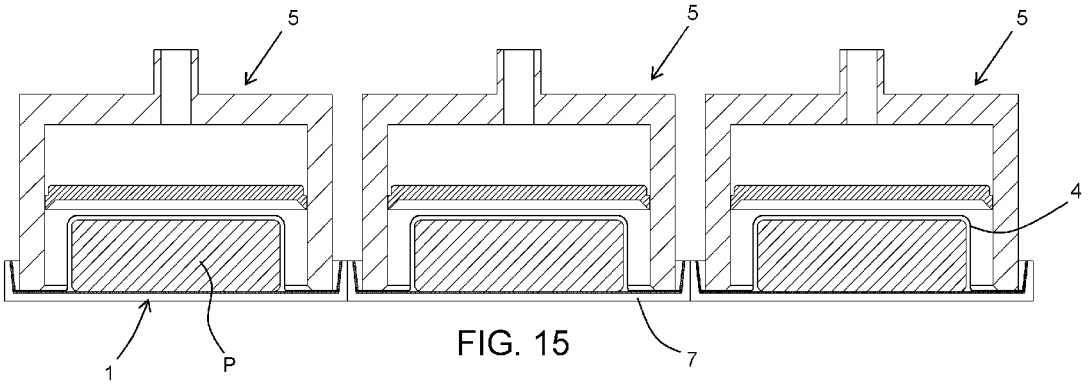

FIG. 15

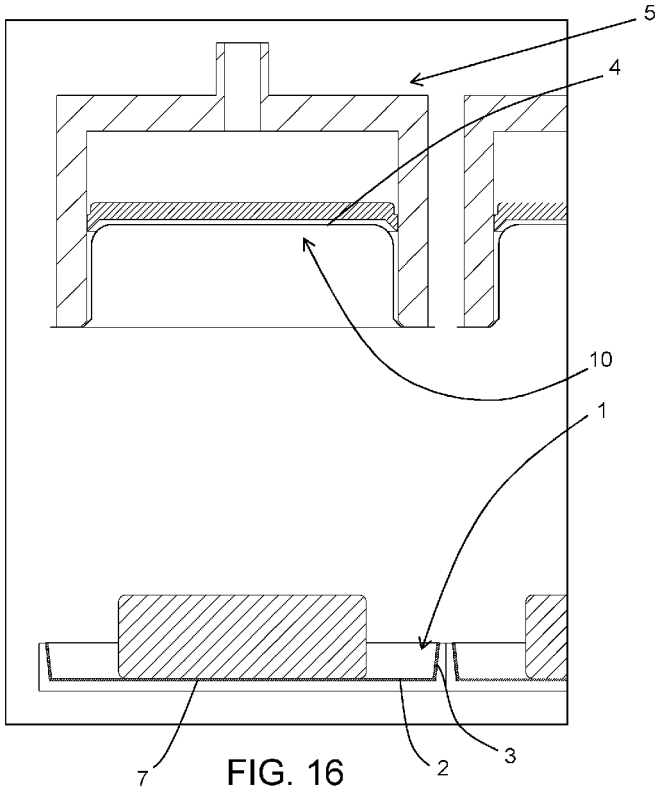

FIG. 16

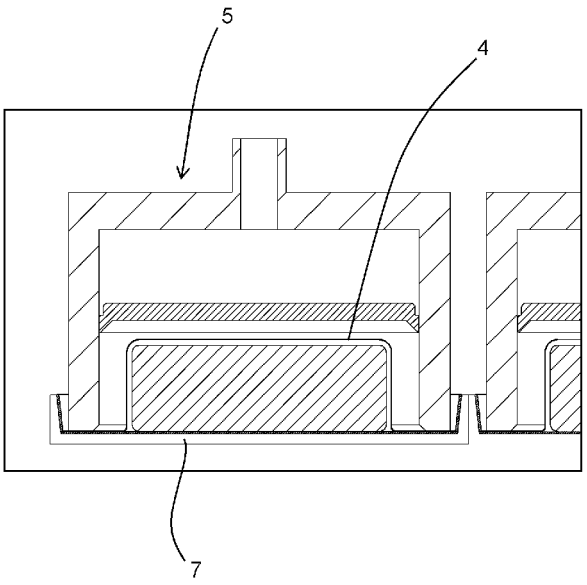

FIG. 17

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EUROPEAN SEARCH REPORT

Application Number
EP 24 15 2964

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B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 June 2024	Ungureanu, Mirela

CATEGORY OF CITED DOCUMENTS

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21-06-2024

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