



## (51) International Patent Classification:

*B65B 11/50* (2006.01)      *B65B 51/14* (2006.01)  
*B65B 47/06* (2006.01)      *B65B 25/00* (2006.01)  
*B65B 49/06* (2006.01)

## (21) International Application Number:

PCT/IB2015/053488

## (22) International Filing Date:

12 May 2015 (12.05.2015)

## (25) Filing Language:

Italian

## (26) Publication Language:

English

## (30) Priority Data:

TO2014A000394 19 May 2014 (19.05.2014) IT

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(81) Designated States (unless otherwise indicated, for every  
 kind of national protection available): AE, AG, AL, AM,  
 AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,  
 BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,  
 DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,  
 HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,  
 KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,  
 MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,  
 PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,  
 SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,  
 TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

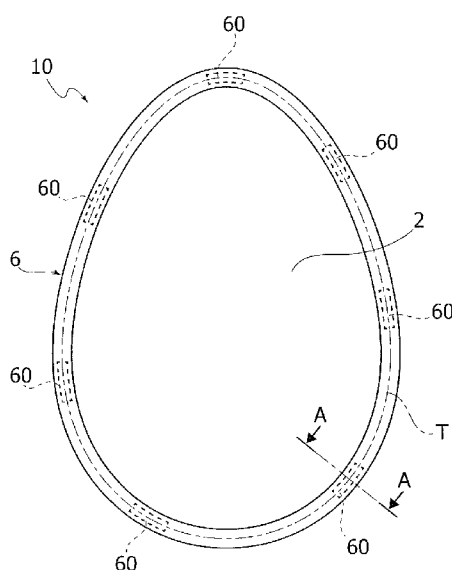
(84) Designated States (unless otherwise indicated, for every  
 kind of regional protection available): ARIPO (BW, GH,  
 GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,  
 TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,  
 TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,  
 DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,  
 LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,  
 SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
 GW, KM, ML, MR, NE, SN, TD, TG).

## Published:

— with international search report (Art. 21(3))

(54) Title: PROCESS FOR PRODUCING A PACKAGE FOR A FOODSTUFF PRODUCT, IN PARTICULAR A CONFECTION-  
 ERY PRODUCT

FIG. 1A



(57) Abstract: A process for packaging foodstuff products having a particular shape, representing, for example, fantasy human or animal characters, or again objects linked to traditions of festivals, such as Christmas bells or Easter eggs, in order to produce packages that reproduce on the outside exactly the particular shape thereof. The process described envisages the use of two sheets of wrapping material coupled together and is characterized in that a perimetral closing flange (6) is provided, which is folded on itself and is sealed along stretches (60).

**"Process for producing a package for a foodstuff product, in particular a confectionery product"**

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Field of the invention

5       The present invention relates to a process for producing a package for foodstuff product, in particular a confectionery product, comprising the steps of:

10       - providing a first sheet of wrapping material, which presents a first portion for receiving said product and a first peripheral portion surrounding said first receiving portion;

15       - providing a second sheet of wrapping material which presents a second portion for receiving said product and a second peripheral portion surrounding said second receiving portion;

      - setting said product on said first receiving portion or said second receiving portion;

20       - coupling said first sheet to said second sheet in such a way that said first and second portions for receiving said product will define together a closed cavity in which said product is housed, and in such a way that said first and second peripheral portions are set in contact with one another so as to form a flange  
25       surrounding said cavity; and

      - folding said flange along a folding line such as to define a proximal flange part and a distal flange part connected to said proximal part by said folding line, said distal part being folded back towards said  
30       cavity, against said proximal part, along said folding line.

General technical problem

35       A process of the type referred to above is known from the European patent No. EP2366631 B1 filed in the name of the present applicant.

The above type of process is frequently used for packaging confectionery products, typically chocolate-based ones, the outer surface of which has a particular shape, representing, for example, fantasy human or animal characters, or again objects linked to traditions of festivals, such as Christmas bells or Easter eggs, in order to produce packages that reproduce on the outside exactly the particular shape thereof. For this purpose, the two sheets of wrapping material of the package are made to adhere to the entire outer surface of the product.

In the above type of package, the aesthetic appearance evidently has the same importance as the protection that it ensures for the product.

In this connection, precisely in order to enhance the aesthetic appearance of the package, usually the folded flange mentioned at the start is obtained so as to identify as a whole a profile substantially corresponding to the external contour of the packaged product so that the product is as if it were framed.

The patent indicated above describes in detail how to obtain the aforesaid folded flange. In this connection, it should be noted that the flange in question has in any case evidently the main function of holding together the two sheets of the wrapper.

The present applicant has, however, noted that packages of the type in question may at times be present on the shelves of sales outlets partially open, with the peripheral portions of the two sheets locally detached. This is due to the fact that, during handling and transport of the packages, the flange can accidentally unfold in one or more parts, and at that point, given that the corresponding peripheral portions of the two sheets are no longer constrained together, they start to separate, thus rendering the inside of

the packages accessible.

Clearly, this possibility constitutes a problem both from an aesthetic standpoint, because the partially open package has in any case lost its  
5 pristine appearance, and obviously from a safety standpoint, in so far as the package can no longer perform its protective function in a complete way.

Object and summary of the invention

The present invention falls within the above  
10 context and its object is to provide a process of the type indicated at the start that will enable a package to be obtained that is less subject to the aforesaid drawbacks.

The aforementioned object is achieved via a  
15 process presenting the characteristics specified in Claim 1. The present invention moreover regards a package obtained via the process in question, and a device for implementing the sealing step envisaged in said process.

20 The claims form an integral part of the technical teaching provided herein in relation to the invention.

Brief description of the drawings

The invention will now be described purely by way of non-limiting example, with reference to the annexed  
25 representations, wherein:

- Figure 1 is a perspective view of a package obtained according to the process described herein;

- Figure 1A illustrates a top plan view of the package of Figure 1;

30 - Figure 1B illustrates a detail of the package of Figure 1 in a cross-sectional view according to the line A-A of Figure 1A;

- Figures 2 to 22 are schematic representations that illustrate successive steps of the process  
35 described herein in a preferred embodiment;

- Figure 23 is a perspective view of a crimping tool used in the framework of the process; and

- Figure 24 is a top plan view of the tool of Figure 23, shown in an operating position thereof together with the article on which the tool operates for carrying out the crimping operation.

Detailed description of the invention

In the ensuing description, various specific details are illustrated aimed at providing an in-depth understanding of the embodiments. The embodiments may be obtained without one or more of the specific details, or with other methods, components, or materials, etc. In other cases, known structures, materials, or operations are not shown or described in detail so that the various aspects of the embodiment will not be obscured.

The references used herein are only provided for convenience and hence do not define the sphere of protection or the scope of the embodiments.

Figure 1 illustrates an example of package for a product P, in the specific case an Easter egg, obtained according to the process described herein.

In general, the above type of package, designated in Figure 1 by the reference number 10, comprises a first sheet of wrapping material 2 and a second sheet of wrapping material 4 coupled together.

The sheet 2 has a portion for receiving the product 2a and a peripheral portion 2b that surrounds the receiving portion 2a. Likewise, the sheet 4 has a portion for receiving the product 4a and a peripheral portion 4b that surrounds the receiving portion 4a.

The sheets 2 and 4 are coupled together in such a way that the receiving portions 2a, 4a will define together a closed cavity C in which the product P is housed, and in such a way that the peripheral portions

2b, 4b are set in contact with one another so as to form a flange 6 surrounding the cavity C (see Figure 1A).

5 The flange 6 is folded on itself so as to identify a proximal part 6a and a distal part 6b joined together along a folding line "s". The distal part 6b is folded back towards the cavity C, against the proximal part 6a, along the line "s". It should be noted that Figure 1B is an enlarged representation that does not respect  
10 the real proportions of the various elements, provided to enable an immediate understanding of the structure of the flange 6. In this figure the folding line "s" is constituted by a perimetral band. However, in the real package the thicknesses of the sheets 2 and 4 have  
15 dimensions that are so small, compared to the structure of the package, that the band can actually be approximated by a line, namely, a folding line.

In various embodiments, as in the one illustrated, the portions for receiving the product 2a and 4a, which  
20 together identify the cavity C, each reproduce the conformation of the outer surface of the corresponding part of the product P so as adhere substantially to the product. This configuration enables the package to reproduce, substantially identically, the shape of the  
25 product contained therein. The receiving portions 2a and 4a may hence be of any shape that depends only upon the shape of the packaged product, and may consequently also differ from one another, for example in the cases where the product has different opposite faces. In this  
30 connection, there may also be embodiments in which the receiving portions 2a and 4a do not both have a generic half-shell shape as in the example illustrated, but, instead, one of them is completely plane.

In various embodiments, as in the one illustrated,  
35 the line of connection of the sheets 1 and 2 inside

the cavity C is, throughout its extension or at least part thereof, directly in contact with the product P, and the folding line "s" of the flange 6 extends parallel thereto, so that as a whole the flange reproduces almost exactly the profile that the product P has in the plane of the flange. The aesthetic result is that of a greater enhancement of the global shape of the product.

In order to produce a package of the type described above the process in question envisages in general the steps of:

- providing a first sheet of wrapping material, which presents a first portion for receiving said product and a first peripheral portion surrounding said first receiving portion;

- providing a second sheet of wrapping material, which presents a second portion for receiving said product and a second peripheral portion surrounding said second receiving portion;

- setting said product on said first receiving portion or said second receiving portion;

- coupling said first sheet to said second sheet in such a way that said first and second portions for receiving said product will define together a closed cavity in which said product is housed, and in such a way that said first and second peripheral portions are set in contact with one another so as to form a flange surrounding said cavity; and

- folding said flange along a folding line such as to define a proximal flange part and a distal flange part connected to said proximal part along said folding line, said distal part being folded back towards said cavity, against said proximal part, along said folding line.

The process described herein is characterized in

that it envisages forming on said flange a plurality of sealing areas 60, distinct and separate from one another, designed to keep the aforesaid first and second sheets together, and in that the sealing areas  
5 are obtained at at least a minimum distance from the aforesaid first receiving portion and/or second receiving portion. In various preferred embodiments, the aforesaid minimum distance is such that the sealing areas are located, after the folding step, in the  
10 distal part of the folded flange, and are not traversed by the folding line. In alternative embodiments, the aforesaid minimum distance is, instead, such that, after the folding step, the sealing areas are in any case traversed by the folding line.

15 It should be noted that by the expression "sealing area" is here to be understood any region of the two sheets 1 and 2 at which they are joined together as a result, for example, of a sealing operation, a gluing operation, or any other operation that has the effect  
20 of getting the two sheets to adhere together in a permanent way.

In various embodiments, as in the one illustrated, the aforesaid sealing areas are set in succession along a closed path - designated in Figure 1A by the  
25 reference T - that surrounds the first and second receiving portions 2a, 4a. In various preferred embodiments, each sealing area has, in a direction substantially orthogonal to the corresponding stretch of the aforesaid closed path, a dimension preferably  
30 smaller than or equal to the width of the distal part 6b of the folded flange 6. In various even more preferred embodiments, this dimension constitutes the minimum dimension of the above area. The areas 60 have a preferably rectangular shape but may even have any  
35 other shape, and may all be the same as one another, or



else the same in subsets, or, again, all different from one another.

As has been said, the sealing areas in question have the function of holding together the two sheets that make up the package in such a way that these do not separate from one another. This overcomes the drawbacks described at the start regarding traditional packages, since, in the case where the folded flange 6 opens locally or completely, the sheets 1 and 2 in any case remain constrained together in the areas 60. In this connection, the maximum distance between two consecutive areas 60 may be chosen in such a way that the sheets 1 and 2 will remain in any case in contact along the portions 2b and 4b between the two areas, even in the absence of the folded flange, as a result of the internal stresses determined by the presence of the two contiguous areas 60. In various preferred embodiments, the distance in question is smaller than or equal to 50 mm, according to the perimeter of the flange and the size of the product. The sealing obtained is not, instead, such as to close the package hermetically.

The characteristic indicated above, inherent in provision of the sealing areas 60 at the aforesaid minimum distance from the receiving portions 2a, 2b, evidently entails, in its preferred embodiment, that the subsequent folding step will involve directly - subjecting them to deformation - only non-sealed portions of the flange 6, and not, instead, also the sealing areas themselves. This makes it possible to obtain a perfectly folded flange, which remains stably in this condition, without the risk of any elastic return towards an unfolded condition. In this connection, the present applicant has in fact noted that the above phenomena of elastic return occurs when

the folding step involves, instead, also or only the sealing areas, i.e., in the cases where these are traversed by the folding line "s". The reason for this behaviour is to be attributed to the fact that, where  
5 the sheets 2 and 4 are sealed together, the flange 6 is as a whole more rigid, and consequently assumes a mechanical behaviour substantially more elastic than the remaining parts.

The characteristic indicated above is moreover  
10 advantageous in the cases where the areas 60 are obtained via a proper welding process, in so far as it prevents the heat necessary for sealing the two sheets from causing at the same time melting or in any case a variation of consistency of the product P. Providing  
15 the sealing areas at a distance from the portions for receiving the product presupposes, in fact, that the sealing means themselves are located at a distance from these portions (which already in itself reduces the amount of heat coming from the sealing means that  
20 reaches the product). In the space provided between these and the product, it is then possible to insert means for protecting the product P from the heat generated during sealing.

Finally, it should be noted that positioning of  
25 the sealing areas 60 on the distal portion 6b of the folded flange 6 guarantees that the end edges of the two sheets 1 and 2 are perfectly coincident, i.e., aligned - thus preventing the internal sides of the two sheets from remaining in view - and that the portions  
30 2b, 4b are laid out perfectly on top of one another without forming any creases.

In view of what has been said above, it is hence evident how the characteristics of the process described herein enable the drawbacks of the known art  
35 linked to accidental opening of the packages to be

overcome, at the same time also guaranteeing optimal aesthetic finish of the packages themselves.

The packaging process will now be described in detail, in its different possible embodiments. For this  
5 purpose, reference will be made to Figures 2 to 25, which are schematic illustrations having merely the purpose of enabling an immediate understanding of the main aspects of the process and of the means used to implement it. In particular, in what follows reference  
10 will be made to production of a single package, but it is clear that the same means described may be easily configured for producing simultaneously a number of packages at the same time.

The process envisages in the first place providing  
15 the first and second sheets of wrapping material 2 and 4 that will constitute the package. The sheets 2 and 4 are preferably made of a plastically deformable material, typically aluminium, of a thickness of from 10  $\mu\text{m}$  to 40  $\mu\text{m}$ , and are coated with a layer of heat-  
20 meltable or heat-sealable material, for example polyethylene or any other plastic material of a similar type, or else are coated with a heat-sealing lacquer.

In various embodiments, as in the one illustrated, the process envisages shaping the first and second  
25 sheets so as to define on them the portions 2a and 4a for receiving the product shown in Figure 1B.

In various embodiments, as in the one illustrated, for this purpose the process envisages use of moulds 8' and 8'', which have respective mould cavities 9 and 11  
30 of a shape corresponding to complementary portions of the outer surface of the product to be packaged. The sheets 2 and 4 are set on the moulds 8' and 8'', and for example with the aid of a pad 10, having a shape complementary to the surface of the mould cavity, are  
35 subjected to a drawing operation through which formed

on the sheets 2 and 4 are the parts 2a and 4a for receiving the product, surrounded respectively by the peripheral portions 2b and 4b, of a substantially plane conformation.

5           In various embodiments, as in the one illustrated, the shaped sheets 2 and 4 are then transferred into the auxiliary supports 12 and 14, which have respective seats 16 and 18, for receiving the shaped parts 2a and 4a, and respective plane surfaces 20 and 22, which  
10 surround the seats 16 and 18 and are designed to support the flange portions 2b and 4b. In various embodiments, as in the one illustrated, one of the above supports, the support 12 in the example illustrated, has an annular slit or groove 24 (see  
15 Figure 5) surrounding the seat 16 of the support, the function of which will be described in what follows.

          In various embodiments, as in the one illustrated, the supports 12 and 14 can be moved with respect to one another between an open condition, for example  
20 illustrated in Figure 4, and a closed condition, for example illustrated in Figure 7, and moreover, in the latter condition, be rotated together, about an axis orthogonal to the plane of the figures. The means for obtaining these movements of the supports 12 and 14 may  
25 be of any type already known to the person skilled in the sector and consequently will not be described in detail herein.

          In the condition illustrated in Figure 5, the article P is positioned, with transfer means in  
30 themselves known, for example of the suction-pad type, in the receiving part 4a of the sheet 4, and, then, by turning over the support 12 through 180° onto the support 14 (Figures 6 and 7), the sheet 2 is coupled to the sheet 4 in a position overlying the surface portion  
35 of the article P that emerges from the seat 18. A

configuration is thus obtained in which the two sheets 2 and 4 are set with their peripheral portions 2b and 4b in contact with one another to form the flange 6, and with their receiving portions 2a and 4a that together define the cavity C containing the product P. Next, the supports 12 and 14 are brought into their open condition as illustrated in Figure 8.

The process described herein envisages at this point providing the sealing areas 60, in order to join the sheets 2 and 4 together.

As has been said previously, the process described herein is characterized in providing the various sealing areas 60 at a given distance from the receiving portions of the two sheets of wrapping material that is greater than or equal to a minimum distance. Preferably, this is selected in such a way that, after the folding step, the sealing areas come to be located on the distal part of the folded flange 6, and are not traversed by the folding line defined therein. This value is hence a function of the width of the proximal part of the folded flange and, in general, with respect to said width, may be the same or greater. The width of the areas 60 themselves - measured for each area in a direction transverse to the corresponding stretch of the aforesaid closed path T - evidently cannot be, instead, greater than the width of the distal part of the folded flange.

In various embodiments, as in the one illustrated, in order to obtain the areas 60 the process described herein envisages the use of a sealing device 52.

This device in general comprises supporting means configured for receiving the sheets 2 and 4 coupled together, which identify a seat on which the receiving portion 2a or 4a of the above sheets is to be set, and a contrast surface, preferably plane, on which the

peripheral portions 2b, 4b is to be set. The device 52 further comprises a pressure element 54 having a series of heating sections 54a corresponding in number and shape to the series of the areas 60 to be obtained on the flange 6. The element 54 is actuated by motor means 53 for pressing with the sections 54a the parts 2b, 4b against the aforesaid contrast surface. In various embodiments, as in the one illustrated, these supporting means are constituted by one of the supports 12 and 14 themselves, in this case the aforesaid seat being constituted by the seats 16 and 18 of the above supports, whereas the aforesaid contrast surface is constituted by their surfaces 20, 22. In alternative embodiments, the supporting means in question are, instead, constituted by a support that is altogether similar to the supports 12 and 14 but is exclusively designed for use with the sealing device 52. In various preferred embodiments, optionally set on the aforesaid contrast surface is an elastic element 44, for example made of silicone, against which the parts 2b, 4b are pressed. The element 44 has the function of compensating, as a result of its elastic consistency, any possible imperfections of the contrast surface and/or of the sections 54a. In various embodiments, as in the one illustrated, the elastic element 44 is received in a corresponding groove obtained in the contrast surface 22.

In the region where the portions 2b, 4b are pressed by the sections 54a, they are sealed together, as a result of the combined action of pressure and heat exerted by the above sections. As has been said, in order to obtain the sealing areas 60, the sections 54a are in a number corresponding to the number of the areas 60 and moreover have a corresponding shape. In particular, the plurality of sections 54a extend along

a closed path such that, in the operative condition of the element 54, they arrange themselves around the receiving portions 2a, 4a, remaining at a distance equal at least to the aforesaid minimum distance of the areas 60, designated by H in Figure 9A.

As may be seen in Figures 9 and 9A, in the aforesaid operative position of the element 54, between the heating sections 54a and the shaped part 4a a free space is provided. In various embodiments, as in the one illustrated, the process envisages inserting in this space means designed to protect the product P from the heat transmitted by the heating sections.

In this connection, in various embodiments, as in the one illustrated, the device 52 preferably comprises a cooling body 56, set within the element 54 and configured for covering the shaped part 4a of the package and the portion of product contained therein, preventing direct exposure thereof to the heating sections and absorbing the heat transmitted by them. The body 56 has in particular a cavity 56a, designed to receive the shaped part 4a, and an edge 56b, which surrounds the cavity and has a width such that it can be inserted in the space between the sections 54a and the shaped part 4a.

The device 52 further comprises means for circulation of a cooling fluid (not illustrated) within the body 56. In particular, the body 56 comprises one or more ducts that are set around the cavity 56a and are associated to supply means designed to cause circulation in these ducts of the cooling fluid. During operation of the device, the cooling fluid absorbs the heat emitted by the heating sections 54a, thus preventing it from heating the portion 4a and the product P.

The body 56 can be carried by the pressure element

54 itself, or else by a separate movement structure, actuation of which is co-ordinated with the element 54.

In alternative embodiments, instead of the cooling body 56 it is possible to envisage simply a body made  
5 of insulating material designed to prevent transfer of heat to the product P.

It should be noted that the protection means described above are optional and, according to the applications, they could even be absent, taking amongst  
10 other things into account that the sealing areas 60 are precisely at a given distance from the product and extend locally for limited stretches and not all around the product itself so that the amount of heat that reaches the product is in any case limited. In  
15 different embodiments, the distance H between the heating sections 54a and the product P may hence be sufficient to prevent damage to the product due to the heat emitted by the above sections.

The means described above may, instead, become  
20 necessary for very delicate articles and/or for very small packages in which sealing is in any case performed very close to the product.

The sealing device 52 described above may constitute a station within a packaging plant, which  
25 carries out on line one or more of the operations previously described, or else may constitute a stand-alone device, supplied to which by the line of the plant are the products P with the corresponding sheets 2 and 4 associated thereto.

30 At the end of the sealing operation, the sheets 2 and 4 are joined together.

After the sealing step, the process described herein finally envisages providing the folded flange of the package.

35 In general, this step envisages folding the flange



6 on itself, along the folding line "s", so as to identify the proximal part 6a and the distal part 6b. Along the folding line "s", the distal part 6b is folded back towards the cavity C, so that it is brought  
5 up against the proximal part 6a. As a result of what has been said previously, the operation of folding of the flange 6 does not subject the sealing areas 60 to deformation, and, once completed, causes these areas to be located in a position corresponding to the distal  
10 part 6b (see Figures 1A and 15 to 23).

Optionally, prior to the folding operation described above, a cutting operation is provided to reduce the flange 6 to the desired width.

In various embodiments, as in the one illustrated,  
15 the cutting and folding operations indicated above are carried out using the methods and devices according to the patent No. EP2366631 cited at the start, which will also be described herein in detail in what follows for completeness of treatment. It is clear, however, that  
20 the operations in question can be obtained also using alternative methods and/or devices. It should be noted in this connection that the advantages discussed above linked to the positioning of the sealing areas at a distance from the product P are clearly achieved also  
25 in the case of use of methods and/or devices different from those described in what follows.

In various embodiments, as in the one illustrated, starting from the condition represented in Figure 11, the wrapping obtained by the sealing operation is  
30 transferred from the support 14 to the support 12. For this purpose, a movement of the supports 12 and 14 is carried out comprising in succession i) turning over the support 12 through 180° onto the support 14 (Figure 11), ii) turning over through 180° the ensemble formed  
35 by the supports 12 and 14 coupled together (Figure 12),

in such a way that the product and the wrapping will pass from a condition where they are carried by the support 14 to a condition where they are carried by the support 12, and finally iii) removing the support 14  
5 from the support 12 (Figure 13).

In various embodiments, as in the one illustrated, the process then envisages an operation of cutting of the flange 6, aimed at obtaining the desired width of the above flange.

10 This cutting operation is preferably carried out causing, simultaneously with cutting, folding of a distal portion of the flange in a condition set at an angle, preferably orthogonal, with respect to the remaining proximal portion, so as to identify already  
15 in this step the aforesaid proximal and distal parts 6a and 6b that will come to form the folded flange in the next process step.

In various embodiments, as in the one illustrated, the above operation can be carried out by means of a  
20 device of the type illustrated in Figure 14, which cooperates with the support 12, provided with the annular groove 24. This cutting device comprises a vertically mobile support 26, associated to which are an annular cutting or dinking member 28 and pressure means 30, 32,  
25 preferably elastically constrained to the support 26, which surround internally and externally the annular cutting member 28. The cutting device is positioned with the pressure means 30, 32 in contact with the flange 6, and with the cutting member 28 designed to  
30 penetrate into the groove 24. The cutting end 28a of the cutting member 28 is able to penetrate into the groove 24 at a slight radial distance from the radially internal wall 24a of the groove 24, this distance being sized so as to be able to receive the folded flange  
35 part.

In this way, during the cutting operation, the pressure means 30, 32 constrain the flange 6, and lowering of the cutting member inside the groove 24 causes, simultaneously with cutting of the peripheral portions of the flange, folding downwards of the distal portion 6b with respect to the proximal portion 6a. The offcuts, designated as a whole by 13, can be removed after the cutting operation, for example by suction in a subsequent process step.

Next, the process preferably contemplates an operation of turning the wrapping material over through 180°, so as to position the folded flange parts upwards. This operation can for example be carried out according to the operating steps of Figures 16, 17, 18, and 19, which comprise turning the support 14 over onto the support 12 to obtain the configuration of Figure 17, in which the wrapping material is closed between the supports 12 and 14, turning the two associated supports 12, 14 over through 180° (Figure 18), and subsequently opening the top support 14 to obtain the configuration of Figure 19.

Then the process envisages that the distal part 6b of the flange will be folded back against the corresponding proximal part 6a.

In various embodiments, as in the one illustrated, in order to carry out the above operation the process described herein envisages use of the crimping device described in the European patent No. EP2366631. The term "crimping", which in mechanical technologies is used to indicate the operation of clinching the edge of riveted metal sheets, is here used in a broad sense to indicate an operation of deformation, folding, and/or clinching of the flange 6.

This device may constitute a station that operates in line within a packaging plant, or else may

constitute a stand-alone device to which the wrappers to be treated can be supplied by the line of the plant.

The device in question may be provided for co-operating directly with one of the supports 12 or 14 described previously, or else, as an alternative, may  
5 comprise its own means for supporting the wrapping material, which, like the supports 12 and 14, in general comprise a seat designed to support one of the two shaped parts 4a or 2a of the wrapping, and a  
10 substantially plane surface, which surrounds this seat and is designed to support the flange 6.

The device in question comprises crimping means provided for bringing about folding and/or clinching of the distal part 6b with respect to the article P,  
15 starting from a configuration of the type illustrated in Figure 20, in which this part is already folded in an angled position, generally practically orthogonal to the surface 22 of the support 14.

The aforesaid crimping means comprise a crimping  
20 tool, designated by 36, which may be a body in the form of a plate provided with an opening 38 (Figure 23), having a perimetral profile 40 homologous and enlarged with respect to the perimetral profile defined by the end of the flange 6.

25 The crimping tool 36 may thus be positioned in contact with the surface 22 of the support 14, with the opening in a position surrounding at a distance the distal portion 6b, i.e., in the configuration of Figure 24, in which the receiving portion 2a is visible, the  
30 perimetral profile defined by the distal portion 6b and the profile 40 of the opening 38 that is positioned at a practically uniform distance from the portions 6a, 6b.

The crimping tool is vertically mobile with  
35 respect to the supporting means between a raised

position and a lowered position, in which it is practically in contact with the surface 22. The crimping tool 36 is moreover mobile in a horizontal plane. Motor means 42 (see Figure 20) are provided for  
5 actuating the crimping tool for its vertical and horizontal movement.

In particular, the motor means 42 are provided for bringing consecutive or non-consecutive stretches of the profile 40 of the opening 38 into contact with a  
10 homologous stretch of the profile defined by the distal portion 6b previously folded. This operation can be carried out in the position in which the bottom end of the crimping tool is in contact with the surface 22 and is useful also for achieving, if need be, a correct  
15 positioning of the distal portion 6b in the position orthogonal to the surface 22 (Figure 20). Next, the crimping tool is subjected to a vertical movement for a distance d greater than the thickness of the flange 6 and such that the bottom end of the profile 40 and of  
20 the opening 38 may still interfere, following upon a horizontal displacement, with the top end of the distal portion 6b (Figure 21).

Consecutively, the crimping tool 36 is subjected to a horizontal movement of approach to the body of the  
25 article P in such a way as to cause further folding inwards of the distal portion 6b (Figure 22) over the proximal portion 6a.

Optionally and in any case preferably, the crimping tool 36 is then subjected to a vertical  
30 movement of approach to the surface 22 of the support 14, in order to cause clinching (Figure 23).

The aforesaid operations, i.e., the operations of Figures 20, 21, and 22 and optionally also the operations of Figure 23 (and clinching operations) are  
35 carried out for further consecutive or non-consecutive

stretches of the profile of the flange. For example, when the article has a generally quadrangular profile, the aforesaid operations are carried out for each side defining the profile.

5           In various embodiments, as in the one illustrated, to reach the consecutive or non-consecutive stretches of the flange 6, the crimping tool is operated according to a translational movement in two mutually orthogonal directions. In the case of the egg-shaped  
10 profile of the figures, the crimping tool can alternatively be pre-arranged for a rotary and eccentric movement in the horizontal plane so as to reach one after another consecutive or non-consecutive stretches of the profile 40 of the opening 38 in  
15 contact with the corresponding portions of the flange 6.

It should be noted that carrying out the crimping operation along the entire flange profile does not constitute an essential and imperative aspect of the  
20 process, in so far as, in given applications, it may be desirable to keep a portion of the flange profile not crimped, i.e., to keep a stretch of the flange profile not folded on itself. The process according to the invention thus presents also the advantage of enabling  
25 execution of the crimping operation only on a portion of the perimetral profile of the flange or on specific portions thereof even not adjacent to one another.

As indicated above, the final clinching operation is optional. For example, in the case of the egg-shaped  
30 body illustrated in the figures, the clinching operation (where necessary) can be carried out in a subsequent stage with an auxiliary tool 36b (Figure 23), vertically mobile under the action of motor means 42a, and provided with an opening the internal profile  
35 of which substantially corresponds to the profile

formed by the folded distal part 6b (i.e., by the folding line "s"). The aforesaid auxiliary tool 36b can be operated in a vertical movement until it comes into contact with the flange folded on itself, so as to  
5 carry out clinching all along its contour, in a single operation.

The crimping device described makes it possible to operate on articles of different shapes, by simply modifying the profile 40 of the opening or openings 38.

10 Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to what has been illustrated herein purely by way of non-limiting example, without thereby departing from  
15 the scope of the invention, as defined by the annexed claims.

CLAIMS

1. A process for making a package for a foodstuff product, in particular a confectionery product, comprising the steps of:

5       - providing a first sheet (2) of wrapping material, which presents a first portion for receiving said product (2a) and a first peripheral portion (2b) surrounding said first receiving portion;

10       - providing a second sheet (4) of wrapping material, which presents a second portion for receiving said product (4a) and a second peripheral portion (4b) surrounding said second receiving portion;

      - setting said product (P) on said first receiving portion or said second receiving portion;

15       - coupling said first sheet (2) to said second sheet (4) so that said first and second receiving portions (2a, 4a) together define a closed cavity (C) in which said product is housed and so that said first and second peripheral portions (2b, 4b) are set in  
20       contact with one another so as to form a flange (6) surrounding said cavity (C); and

      - folding said flange (6) along a folding line ("s") such as to define a proximal flange part (6a) and a distal flange part (6b) connected to said proximal  
25       part along said folding line, said distal part being folded back towards said cavity, against said proximal part, along said folding line,

      said process being characterized in that it envisages providing a plurality of sealing areas (60)  
30       on said flange, which are distinct and separated from one another, and are designed to hold together said first sheet and said second sheet (2, 4), in which said sealing areas are provided at least at a predetermined minimum distance (H) from said first and/or second  
35       receiving portions.



2. The process according to Claim 1, wherein said minimum distance is such that, after said folding step, said sealing areas (60) all come to be located in said distal part (6b) of said folded flange (6), and are not  
5 traversed by said folding line ("s").

3. The process according to Claim 1 or Claim 2, wherein said distance is equal to or greater than the value of the width of said proximal part (6b) of said folded flange.

10 4. The process according to any one of the preceding claims, in which said sealing areas (60) are arranged in succession along a closed path (T) that surrounds said first and second receiving portions (2a, 4a).

15 5. The process according to any one of the preceding claims, wherein each sealing area (60) has, in a direction substantially orthogonal to the corresponding stretch of said closed path (T), a dimension that is smaller than or equal to the width of  
20 said distal part (6b) of said folded flange (6).

6. The process according to any one of the preceding claims, wherein said step of forming said sealing areas (60) envisages the following steps:

- providing sealing means (54) configured for  
25 pressing together and heating said first and second peripheral portions (2b, 4b) so as to obtain said sealing area (60);

- setting said sealing means (54) on said first and second peripheral portions (2b, 4b) so as to obtain  
30 a space between said sealing means and said first and/or second receiving portions;

- providing in said space means (56) designed to protect the product (P) from the heat generated by said sealing means (54); and

35 - obtaining, via said sealing means, said

plurality of sealing areas (60).

7. The process according to Claim 6, wherein said means designed to protect said product comprise a cooling body (56).

5       8. The process according to any one of the preceding claims, wherein said step of providing said first and/or second sheets of wrapping material (2, 4) comprises the step of forming said first and/or second receiving portions (2a, 4a) in the form of the outer  
10 surface of the corresponding part of said product (P).

9. A package for a foodstuff product, in particular a confectionery product, comprising:

- a first sheet (2) of wrapping material, which presents a first portion for receiving said product  
15 (2a) and a first peripheral portion (2b) surrounding said first receiving portion; and

- a second sheet (4) of wrapping material, which presents a second portion for receiving said product (4a) and a second peripheral portion (4b) surrounding  
20 said second receiving portion;

wherein said first and second sheets (2, 4) are coupled together so that said first and second portions (2a, 4a) for receiving said product together define a closed cavity (C) in which said product (P) is housed,  
25 and said first and second peripheral portions (2b, 4b) are in contact with one another so as to form a flange (6) surrounding said cavity (C); and

wherein said flange (6) is folded back on itself along a folding line ("s") defining a proximal flange part (6a) and a distal flange part (6b) connected to  
30 said proximal part along said folding line, said distal part being folded back (6b) towards said cavity (C) against said proximal part (6a), along said folding line,

35       said package being characterized in that said

flange (6) comprises a plurality of sealing areas (60), which are distinct and separated from one another, and which are designed to hold said first and second sheets (2, 4) together.

5           **10.** The package according to Claim 9, wherein said sealing areas (60) are all located in said distal part (6b) and are not traversed by said folding line ("s").

**11.** The package according to Claim 9 or Claim 10, wherein said sealing areas (60) are arranged in  
10 succession along a closed path (T) that surrounds said first and second receiving portions (2a, 4a).

**12.** The package according to Claim 11, wherein each sealing area (60) has, in a direction substantially orthogonal to the corresponding stretch  
15 of said closed path (T), a dimension that is smaller than or equal to the width of said distal part (6b) of said folded flange (6).

**13.** A device for implementing the sealing step in a process according to Claims 1 to 8, comprising:

20           - supporting means (14), which are configured for supporting said first and second sheets (2, 4) coupled together and identify a seat or area (18) on which said first receiving portion (2a) or said second receiving portion (4a) are to be set, and a contrast surface  
25 (22, 44) on which said flange (6) formed by said first and second peripheral portions (2b, 4b) in contact with one another is to be set; and

              - sealing means, comprising a pressure element (54), which has at least one heating section (54a), and  
30 means for actuating said pressure element (54) in an operative position, in which said heating section (54a) presses said flange against said contrast surface (22) so as to weld together said first and second peripheral portions (2b, 4b),

35           said device being characterized in that said

element has a series of heating sections (54a), which are distinct and separated from one another, and which are arranged in succession along a closed path the shape and/or length of which are/is such that in said  
5 operative position said heating sections (54a) surround said seat or area (18) at a given distance therefrom.

14. The device according to Claim 13, comprising a body (56) for protecting said product (P), set within said closed path, which has a cavity (56a) designed to  
10 receive said second receiving portion (2a) or first receiving portion (4a), and an edge (56b) surrounding said cavity (56a), which has a width such as to fit into the space comprised in said distance between said heating sections (54a) and said seat or area (18) in  
15 order to cover said first receiving portion (2a) or said second receiving portion (4a) for protection from said heating sections (54a).

15. The device according to Claim 13 or Claim 14, wherein said body comprises one or more ducts arranged  
20 around said cavity (56a), and wherein supply means are associated to said ducts for ensuring circulation of a cooling fluid through them.

16. A foodstuff product packaged according to the process of any one of Claims 1 to 8.

FIG. 1

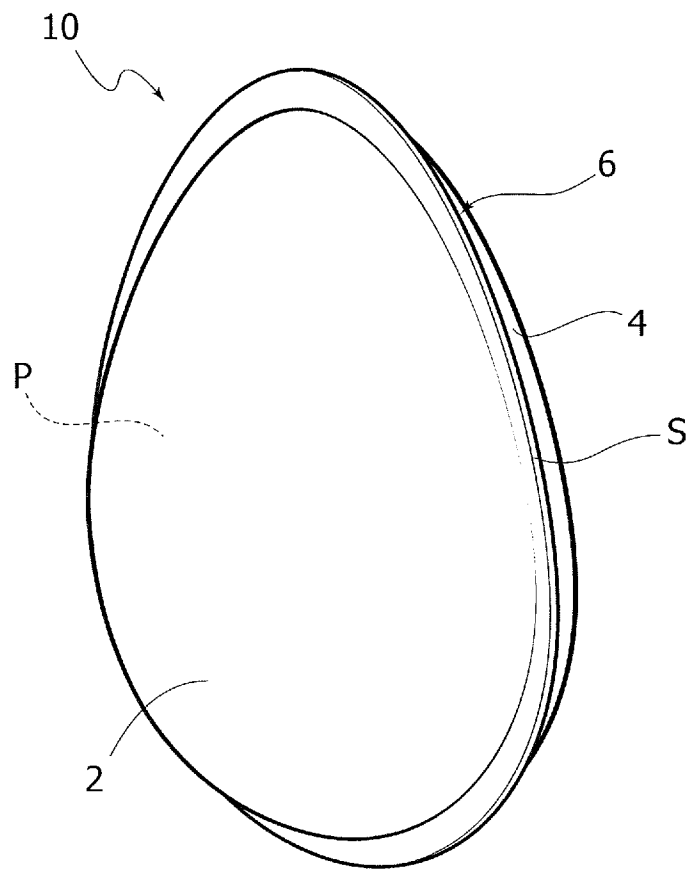


FIG. 1A

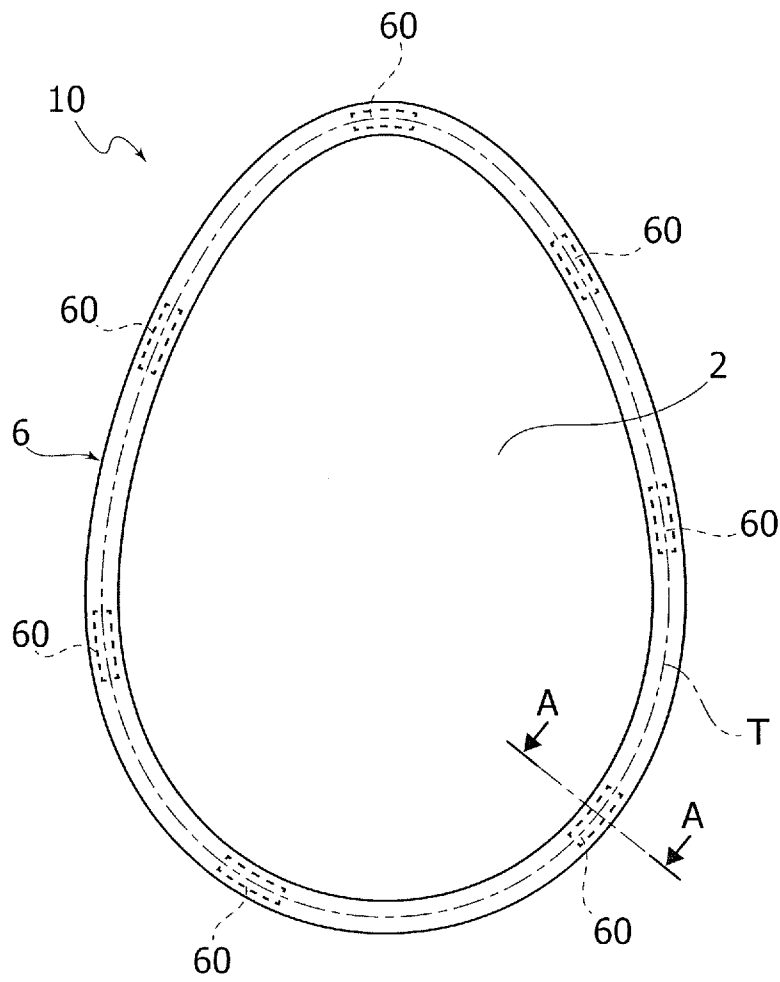


FIG. 1B

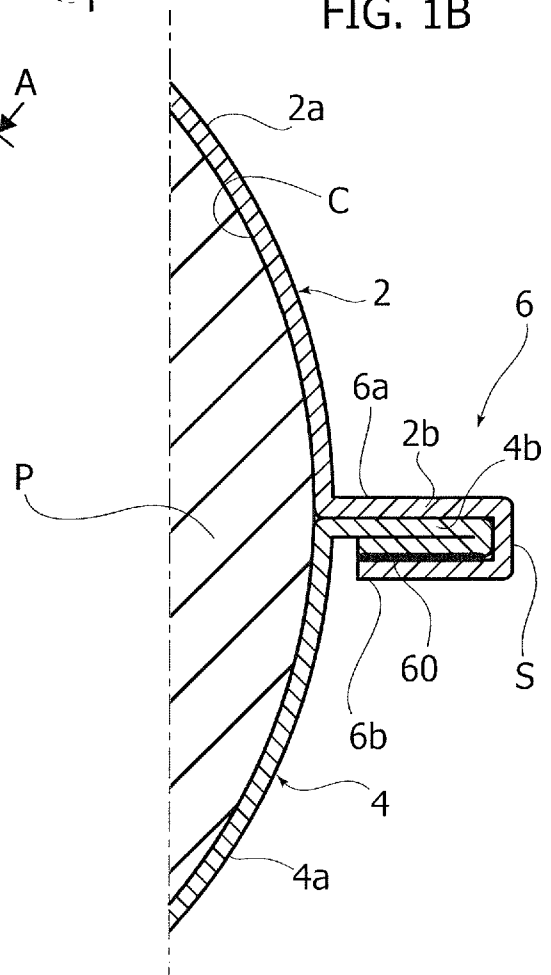


FIG. 2

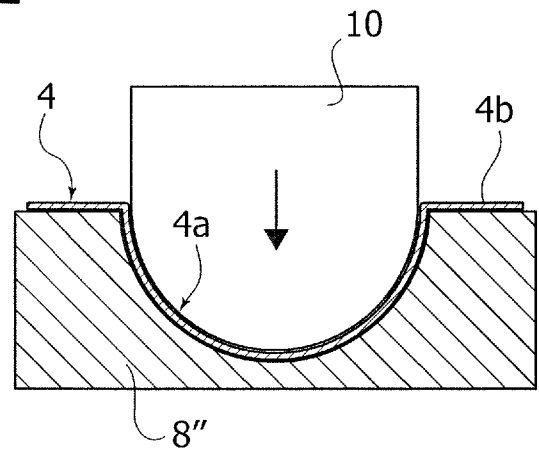
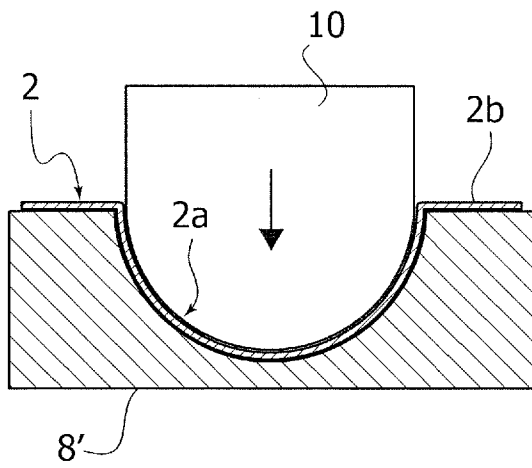


FIG. 3

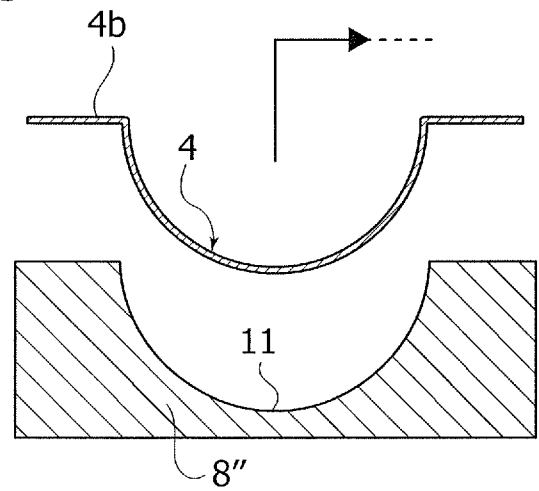
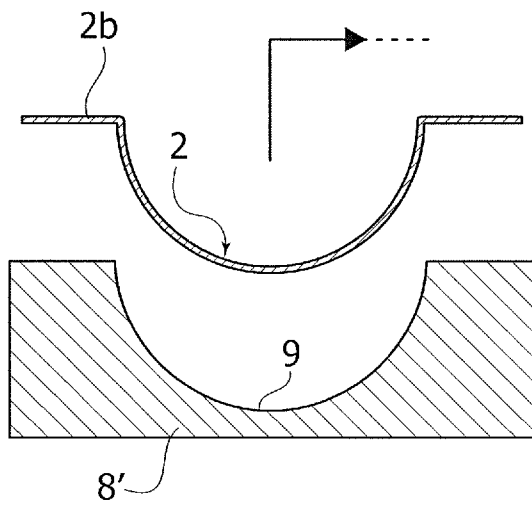


FIG. 4

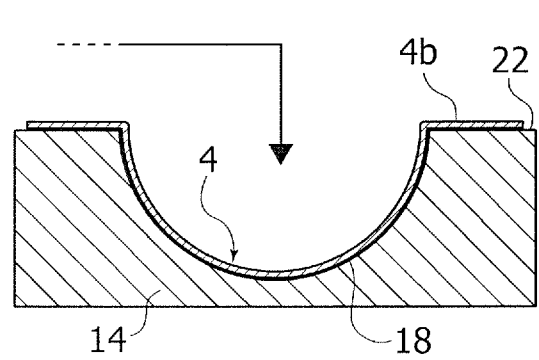
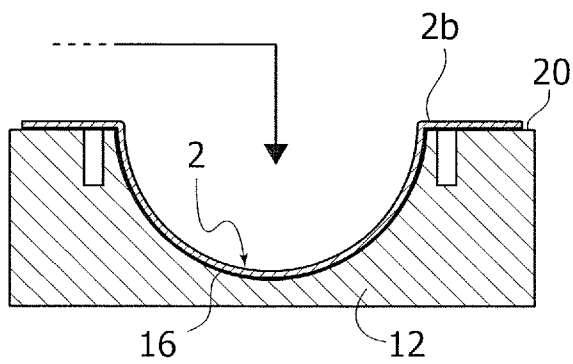


FIG. 5

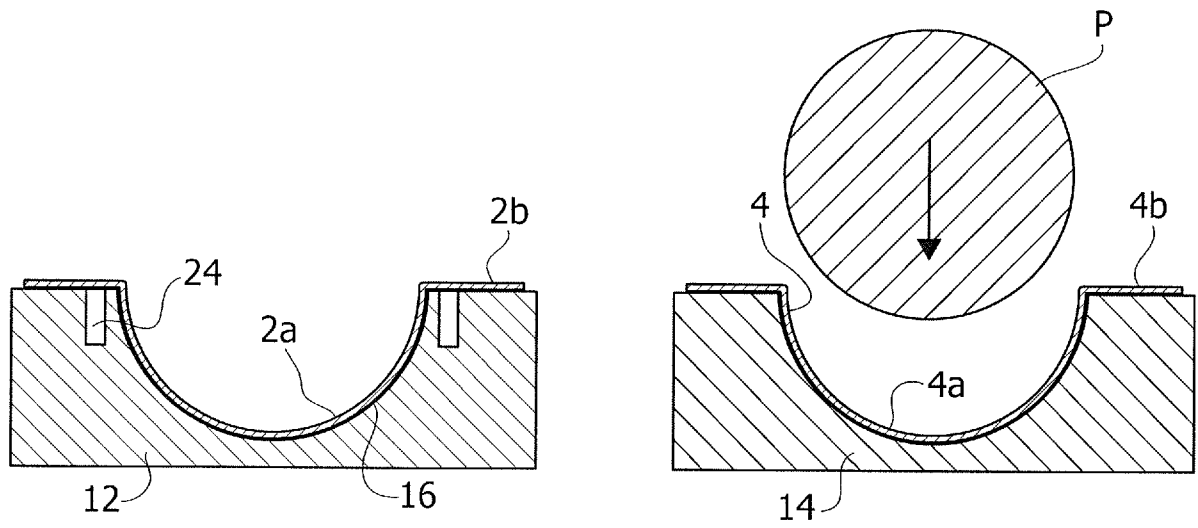


FIG. 6

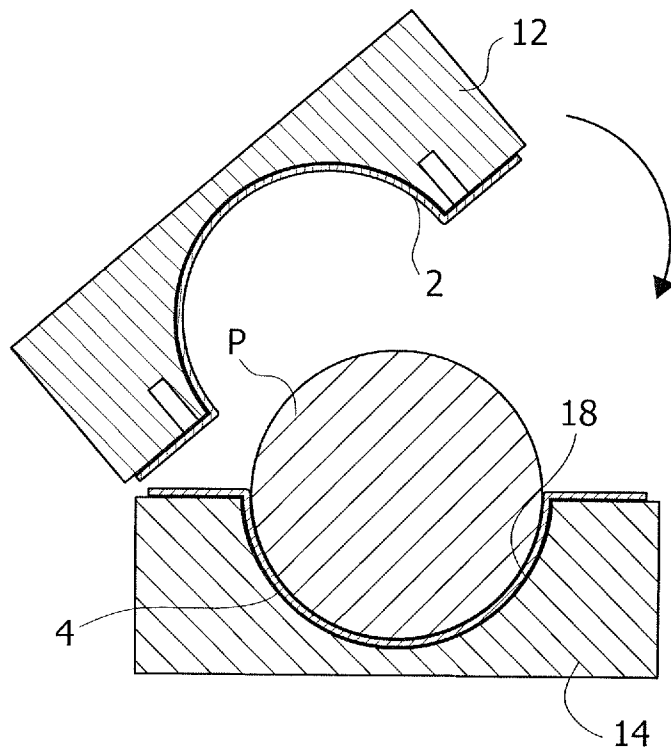




FIG. 7

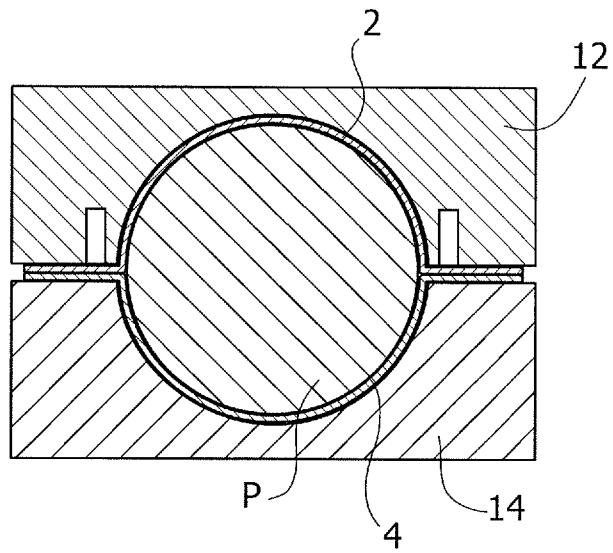


FIG. 8

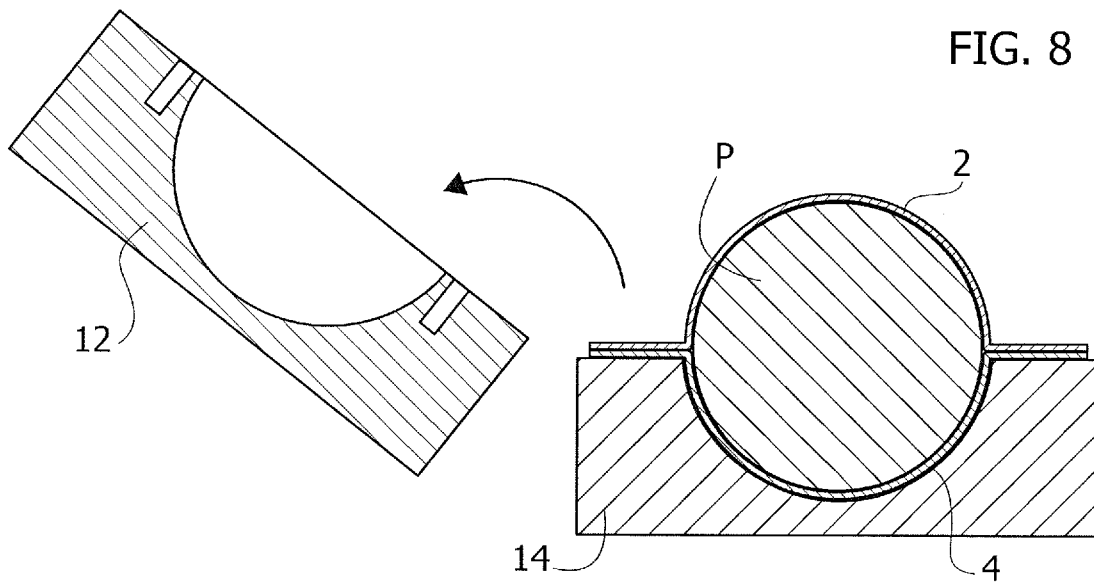


FIG. 9

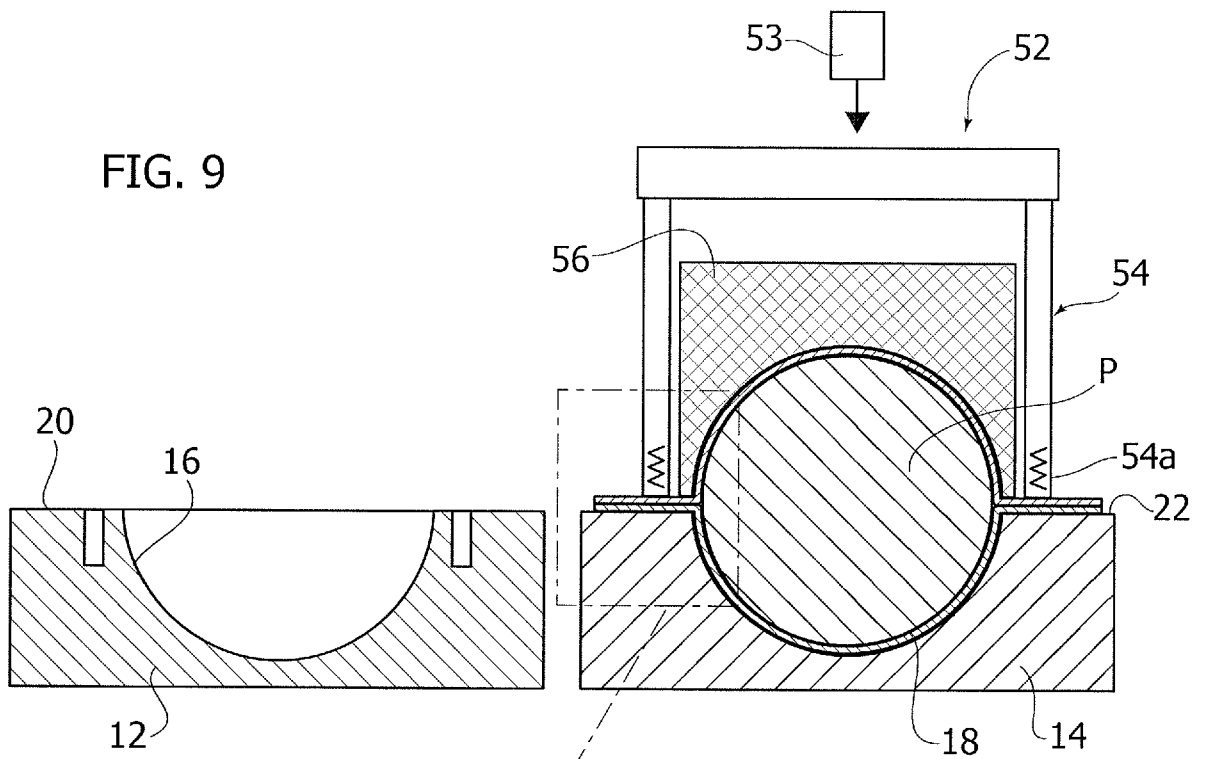


FIG. 9A

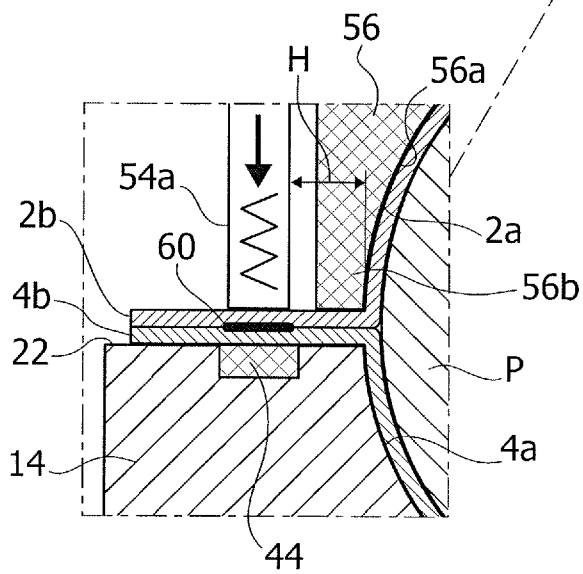


FIG. 10

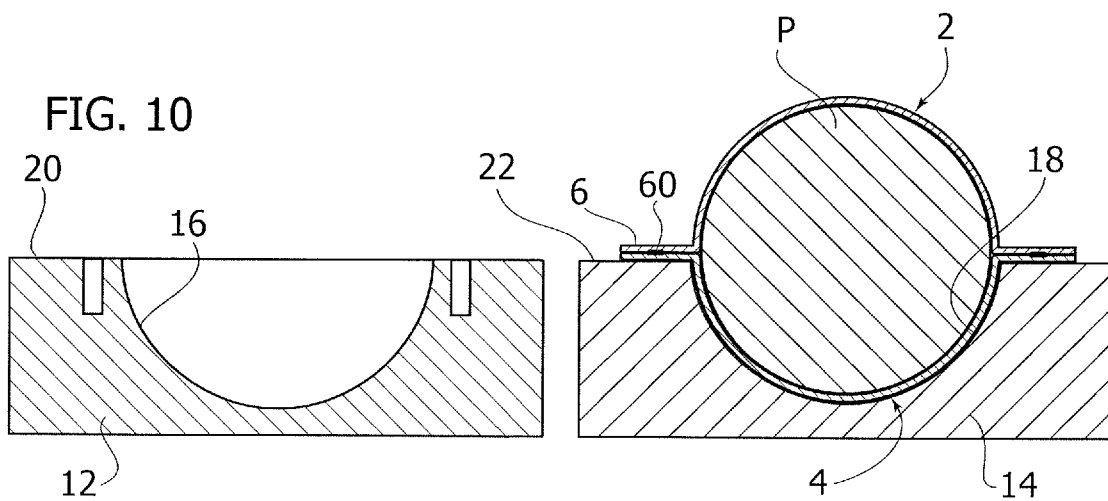


FIG. 11

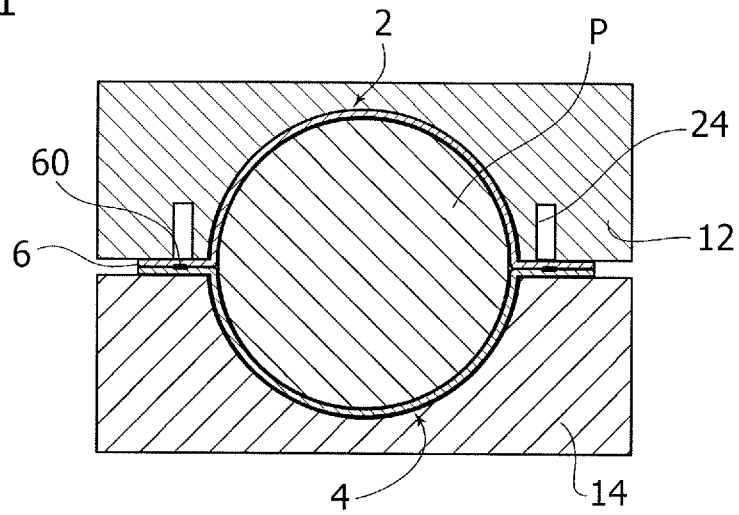


FIG. 12

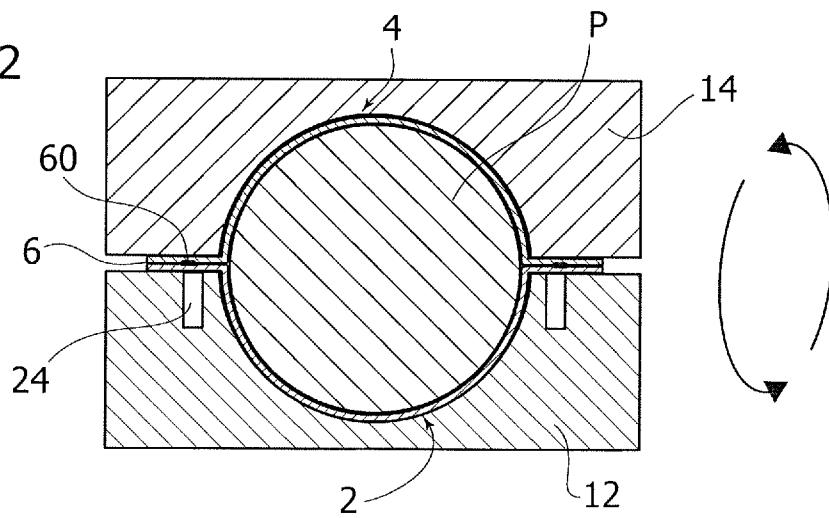


FIG. 13

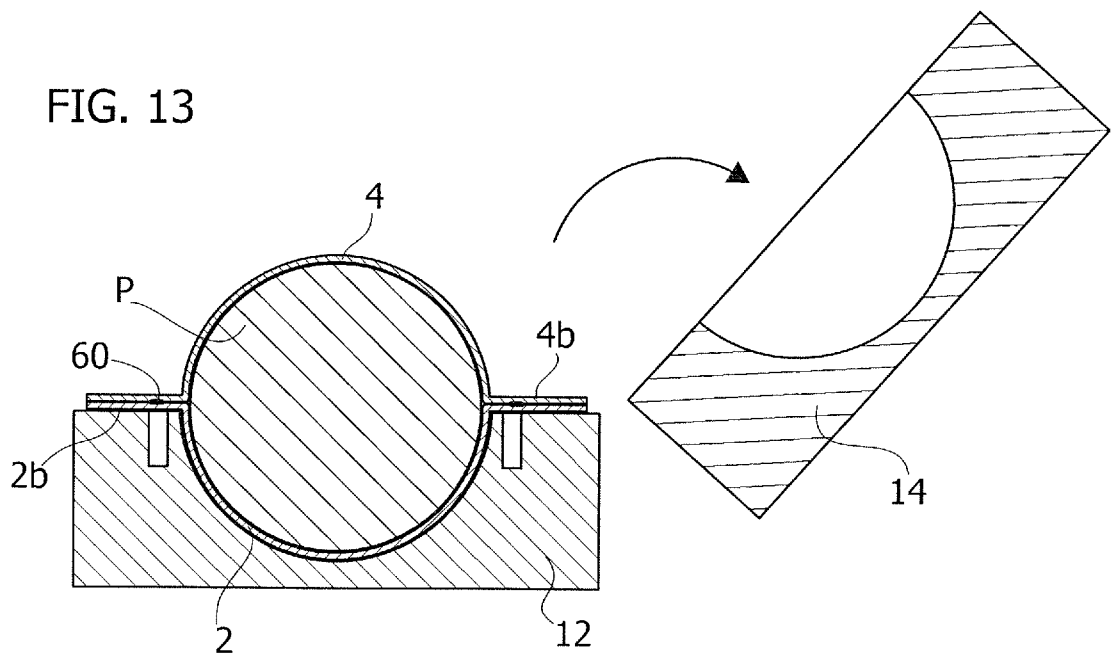


FIG. 14

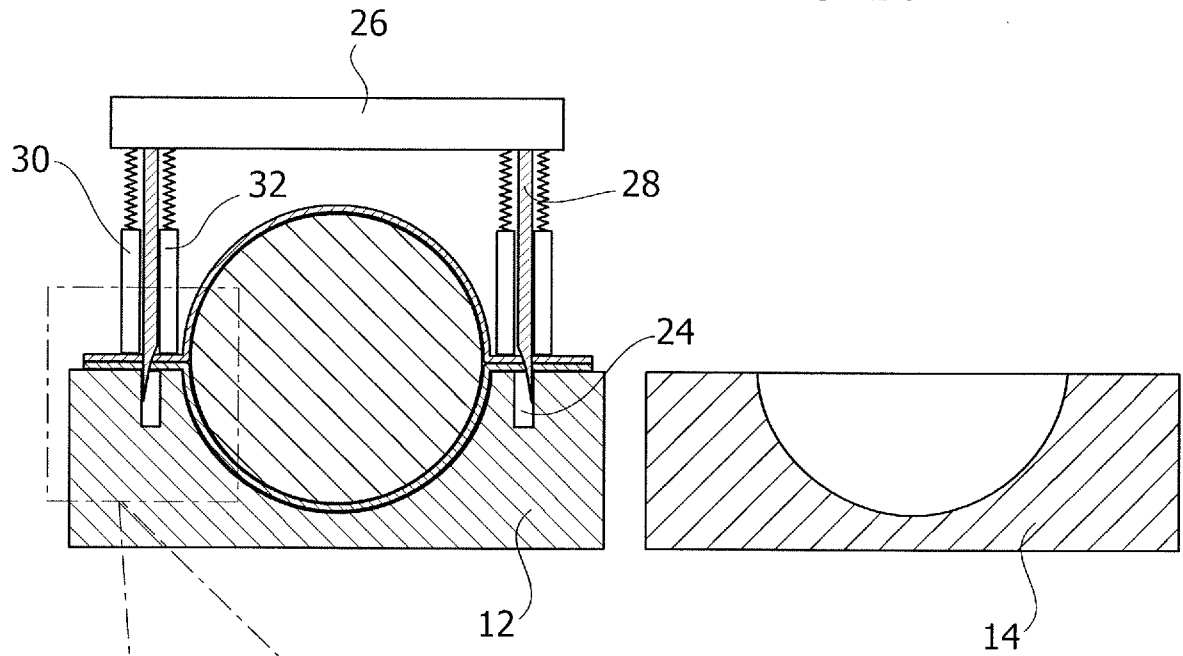


FIG. 14A

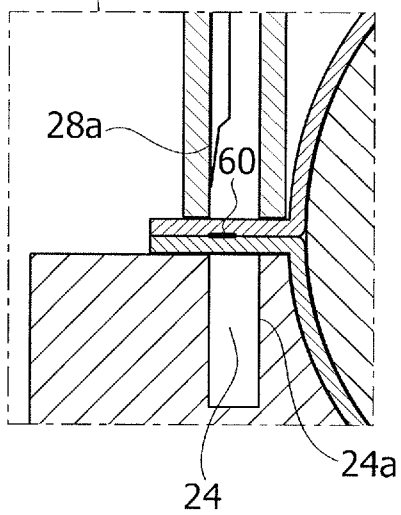
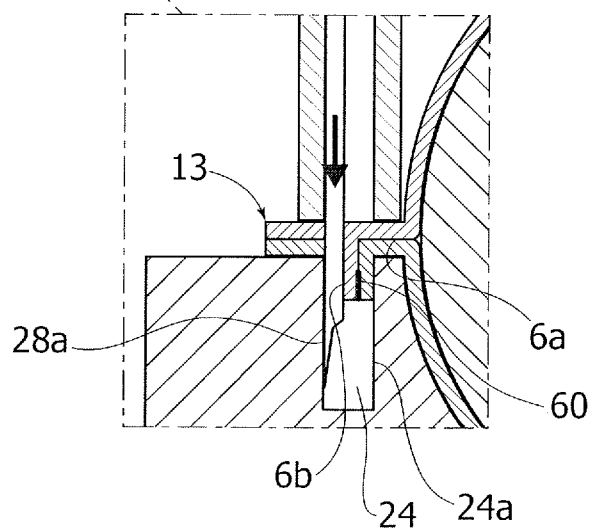


FIG. 14B



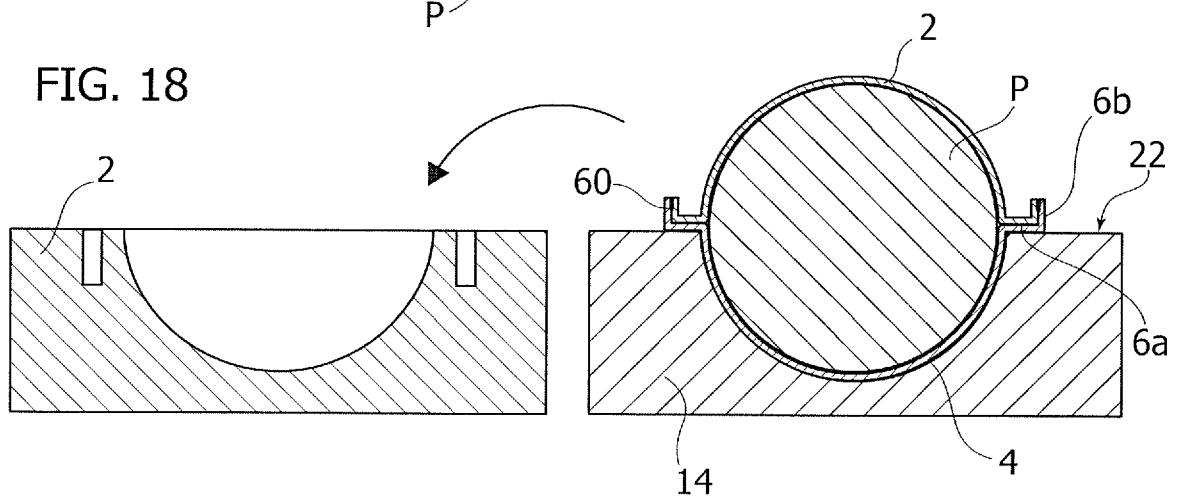
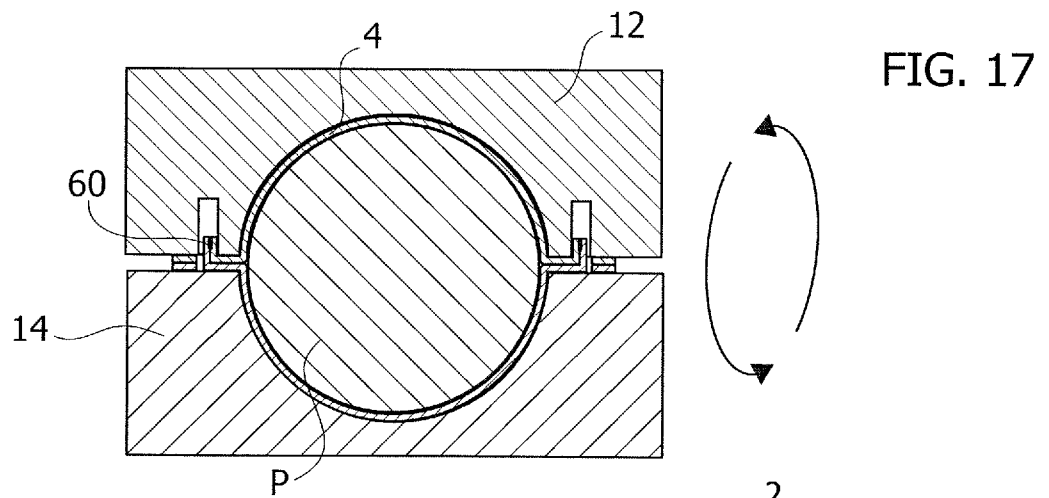
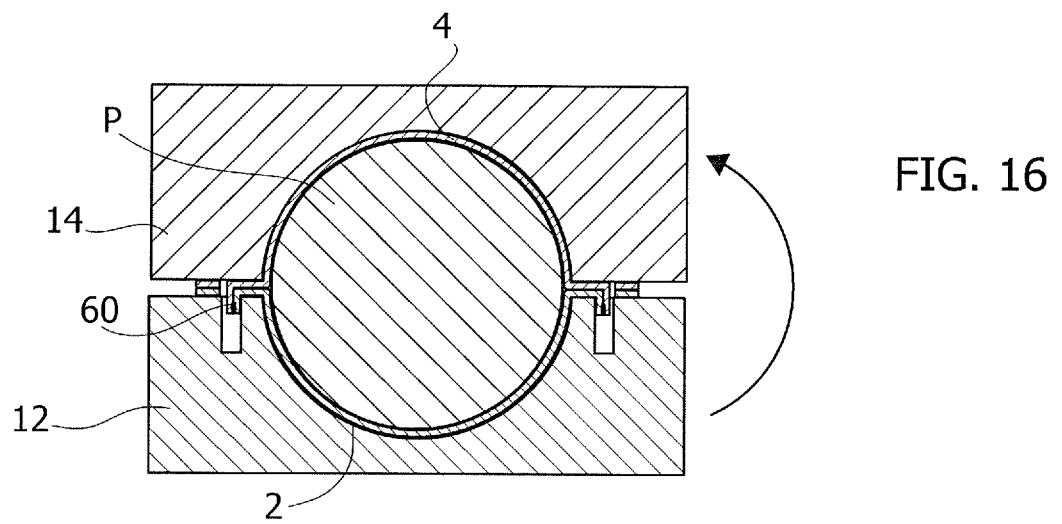
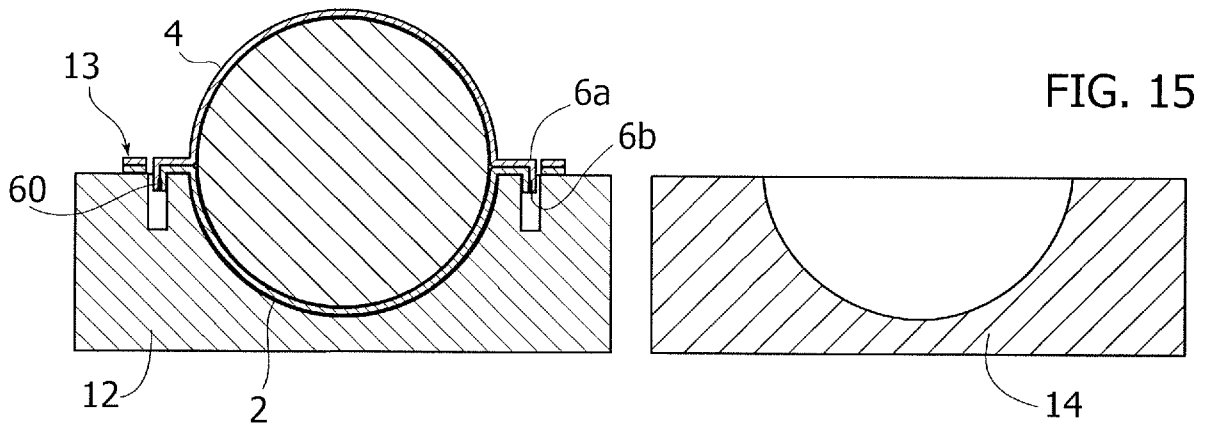


FIG. 19

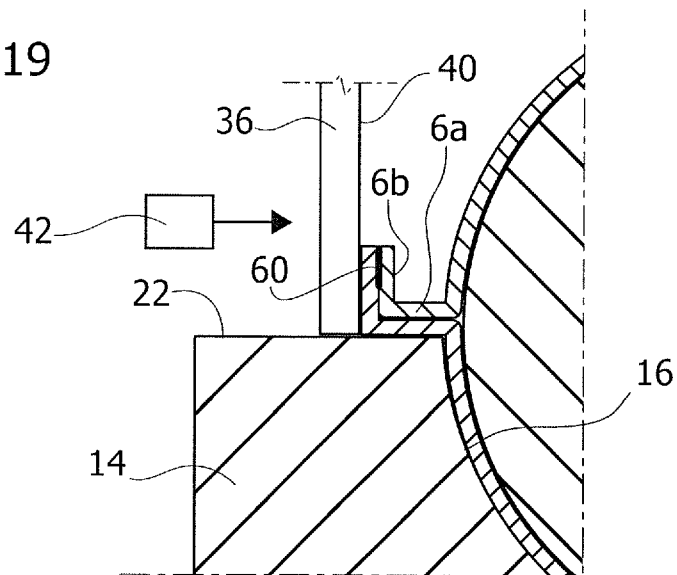


FIG. 20

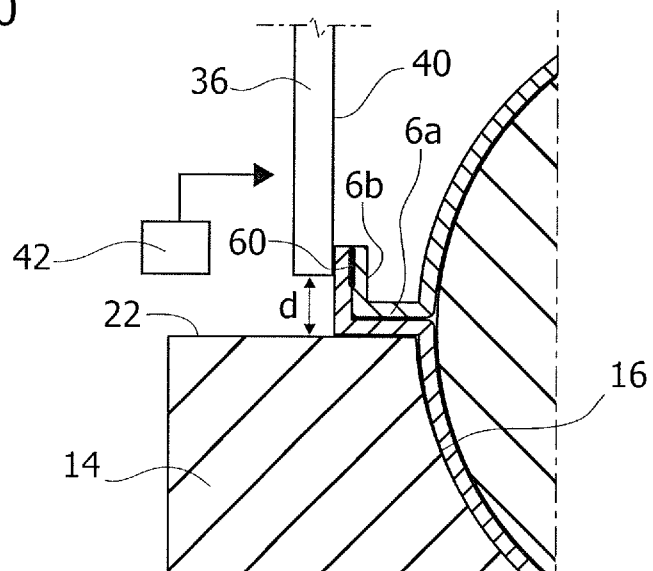


FIG. 21

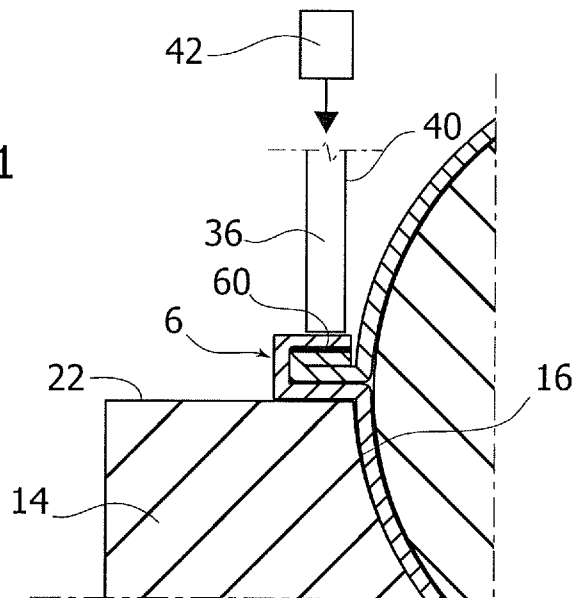


FIG. 22

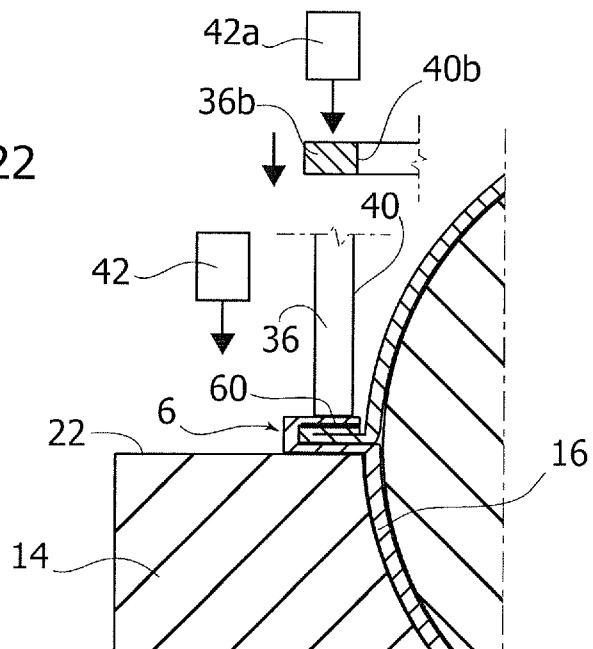


FIG. 23

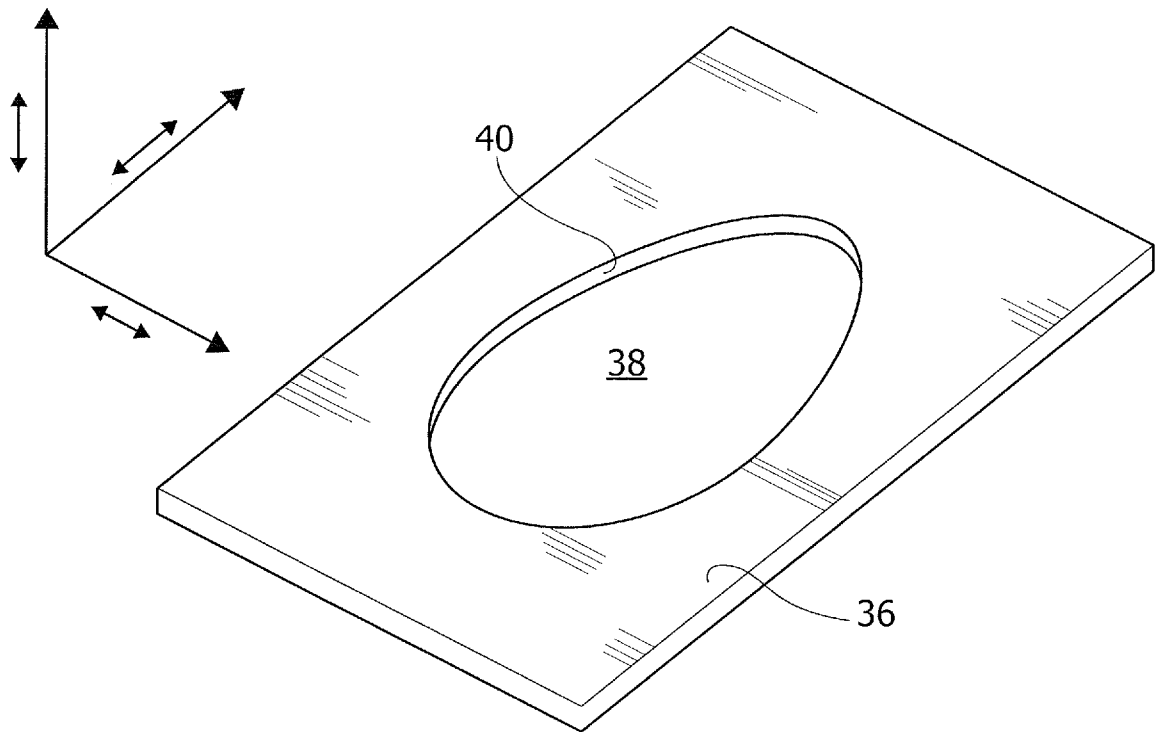
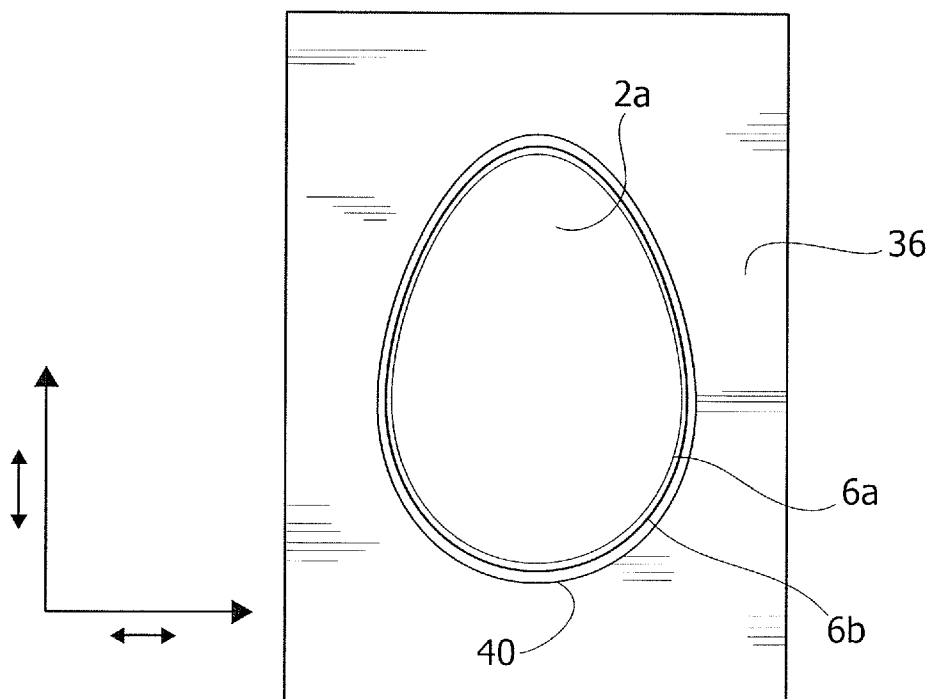


FIG. 24





## INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2015/053488

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. B65B11/50 B65B47/06 B65B49/06 B65B51/14 B65B25/00 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) B65B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 2 366 631 A1 (SOREMARTEC SA [BE]; FERRERO SPA [IT]; FERRERO OHG [DE]) 21 September 2011 (2011-09-21) the whole document	1-16
Y	WO 2009/084045 A1 (SOREMARTEC SA [BE]; FERRERO SPA [IT]; FERRERO OFFENE HANDELSGELLSCHA [ ] 9 July 2009 (2009-07-09) page 9, line 26 - page 11, line 11	1-16
Y	WO 2008/018008 A1 (SOREMARTEC SA [BE]; FERRERO SPA [IT]; FERRERO OHG [DE]; MANSUINO SERGI) 14 February 2008 (2008-02-14) claim 7	6,7,15
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search  18 August 2015		Date of mailing of the international search report  02/09/2015
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer  Yazici, Baris

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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