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(54) **BAG-SHAPED PACKAGE FOR BREAD, METHOD FOR ITS MANUFACTURE AND USE**

(57) The invention relates to a bread package comprising a double adhesive connection, which is provided on a first end of steps, i.e. a basic step, an intermediate step and a protruding step. After folding over of a fold flap from the front wall, a robust and closed construction is obtained with the rear wall, with furthermore a direct adhesive connection between the rear wall and part of the front wall comprised in the fold flap.

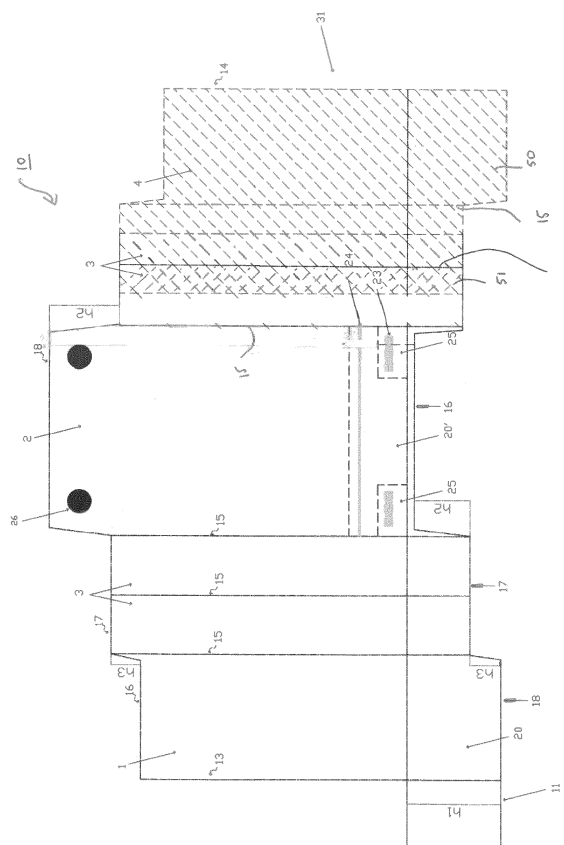


Fig. 8

Description

Field of the invention

[0001] The invention relates to a method of manufacturing a package for bread, comprising:

- Providing paper with a width;
- Subdividing the paper into sheets along separation lines that extend over the width and are defined at a predefined distance from each other, in a main direction, wherein the separation line defines a pattern with a basic step and a further in the main direction protruding step, which protrudes with respect to the basic step;
- Folding the paper along fold lines so as to form a front wall, a rear wall and side walls, wherein the fold lines are defined so as that the one or more protruding step are present at the front wall and/or the rear wall, and wherein a wrapper is formed from the sheet, such that the protruding steps are present at a first and a second end thereof;
- Folding the protruding step at a first end of the sheet so as to form a folded flap;
- Adhering the fold flap to the opposed side with an adhesive connection.

[0002] The invention further relates to a package for bread that can be manufactured with the method, and on the use of the package for packaging of bread.

Background of the invention

[0003] Bread is commonly packaged in a package, more particularly a bread bag, made of cellophane or paper or a combination thereof. Paper is more suitable than cellophane (plastic), since the permeability of paper for humidity is higher than that of cellophane. This reduces the risk that the bread becomes mouldy. At the same time, a paper package ensures that the bread keeps its crispy crust. Disadvantages of paper are however that it is less flexible and that paper does not adhere well in a simple heat treatment. An adhesive connection and/or different connection, such as with metal staples, is thus needed.

[0004] It is increasingly desired to provide such a package with a continuous window. A specific example is known from EP1894714B1, wherein the window is arranged partially on the rear wall and faces the inside of the bag. According to said patent, the window comprises a PET film that is connected with a polyurethane adhesive to the paper, and furthermore a second polymer film that constitutes substantially the entire front wall. The package has however as a disadvantage that it is altogether rather complex, and therewith too expensive for many applications. Moreover, it is not clear whether the package meets the demands in the market, wherein a window in one of the side walls seems preferred.

[0005] Conventional bread bags are manufactured from a roll of paper. After that the paper has been unrolled from the roll, the paper arrives, in a propagation direction, under a perforation knife. This perforation knife has been set to perforate the paper at a predefined distance along the separation line. The separation line is not a straight line, but includes a pattern with a basic step and a protruding step. Thereafter, folds are applied into the paper, along predefined fold lines. Subsequently, the paper is passed through an apparatus, in which the paper is subdivided into sheets along the predefined separation line. The sheets are therein reshaped into a wrapper, as opposite edges of the paper have been arranged to face each other during the folding operation. In a further step of the process, these opposite edges are adhered to each other, for instance by means of adhesive. It is deemed suitable, in view of practical considerations, to carry out the adhering step simultaneously with the adhering step required to adhere the fold flap at the first end to the opposed side.

[0006] Sometimes, it is necessary to remove portions of the paper. This relates to paper portions at opposed side of the protruding step or steps. The protruding steps for both ends are therein in line, when seen in the main direction. Thus removal step is also known as the cutting out of the paper. The cutting out is desired, amongst others, for packages with a transparent window of polymer material, especially for bread that is packaged industrially. Such industrial packaging occurs typically with an apparatus as known from NL9101904, wherein bags hang on the protruding step of the rear wall. The protruding step is thereto for instance provided with one or more holes, configured for hanging on mounting bars or brackets of the apparatus. The holes need to be defined in the paper, since the polymer material of the window is insufficiently strong and/or could lead to unpredictable stretching and/or tearing of the polymer. However, the cutting out of these side-wise portions requires complex production equipment, giving rise to many issues during production. An apparatus with three rolls is required and the cut out materials needs to be removed by sucking.

[0007] If the window is not continuous or no window is present, the package can also be made by means of cutting out. An alternative is that the front wall and the rear wall are staggered, in the main direction. The protruding step at the front wall is then folded to a fold flap that is attached to the rear wall. A disadvantage of this package is however, that there is regularly loss of bread crumbs. This disadvantage occurs particularly when these alternative packages are used for industrial packaging of bread.

Summary of the invention

[0008] It is therefore an object of the present invention to provide a package that is effective and can be produced in an efficient manner, and wherein the package is provided with a window that is arranged in at least one

of the side walls, and wherein the package is nonetheless substantially free of leakage, such that spilling of bread crumbs is prevented.

[0009] It is a further object of the invention to provide a method of the type defined in the opening paragraph, with which desired functionality can be obtained without the need of cutting out paper portions.

[0010] This object is achieved in a bag-shaped package consisting partially of paper and being provided with a transparent window, particularly for bread, in accordance with claim 1. The package comprises a front wall and a rear wall, each of which is provided, when seen in a main direction, of two ends and two side edges, and wherein side walls extend between said side edges of the front and rear wall, wherein the package is closed at a first end with a fold flap, that has been formed by folding of a protruding step that protrudes in the main direction over a first height extending to one of the sides and that has been attached with an adhesive connection to the other side, and wherein the package is suitable for moving in and out an object such as bread. Herein the fold flap has been defined such that a strip of the side walls is folded together with the fold flap, which strip has a second height in the main direction that is less than the first height, wherein the transparent window is arranged at the front wall, while the fold flap is adhered to the rear wall. The transparent window, continuous in the main direction, is connected to the paper along a side edge, which side edges is arranged in the front wall, and wherein the transparent window extends to a window edge that is arranged in the adjacent side wall or at the rear wall.

[0011] The object is further achieved in a method of manufacturing a package for one or more objects, particularly food stuff such as bread, in accordance with claim 8, comprising the steps of:

- Providing a substrate with a first and opposed second side edge, which edges are separated from each other over a width of the substrate, which substrate is partially made of paper and is provided with a transparent window that is continuous in a main direction;
- Subdividing the paper into sheets along separation lines that extend over the width and are defined at a predefined distance from each other, in a main direction, wherein the separation line defines a pattern with a basic step and a further in the main direction protruding step, which protrudes with respect to the basic step;
- Folding the paper along fold lines so as to form a front wall, a rear wall and side walls, wherein the fold lines are defined so as that the one or more protruding step are present at the front wall and/or the rear wall
- Forming a wrapper from the sheet with an adhesive means;
- Folding the protruding step at a first end of the sheet so as to form a folded flap;

- Adhering the fold flap to the opposed side with an adhesive connection, by means of which the wrapper is transformed into the bag-shaped package,

5 Wherein:

- The separation line defines a pattern, wherein an intermediate step is present between the basic step and the protruding step, which intermediate step has a second height in the main direction with respect to the basic step that is less than the first height, which intermediate step is present in the side walls after the folding of the sheet, and
- The fold flap is defined such that a strip of the side walls is folded with the fold flap.

[0012] Thanks to the construction of the bag-shaped package loss of crumbs is limited or even substantially prevented, notwithstanding that the window is present in the side wall. It has turned out that the crumbs may leave the bread bag via the corners of the fold flap, but actually only if these corners are weakened, for instance because one of the corners comprises a window of a polymer material such as cellophane, PET, PE or polypropylene (PP). Particularly for these bread bags, it is advantageous to apply a pattern with both a protruding step and an intermediate step, and to seal the bag in a better way.

[0013] Moreover, it has turned out that the package may be manufactured from a substrate wherein the continuous window is arranged at a side edge. There is therefore, prior to forming the wrapper, merely on one edge - the window edge - an adhesive connection between the paper and the window. During the step of subdividing the substrate, the window is subdivided as well. This simultaneous subdivision of different materials turns out to work well in the applied method. Even the transition from the protruding step to the intermediate step and/or the transition from the intermediate step to the basic step may be applied in the window material.

[0014] Furthermore, it turns out that cutting out is no longer required, when applying the intermediate step. All types of packages, particularly bread bags, may now be manufactured with the same method. The reduction of the number of production methods provides in itself already a significant gain in efficiency. An additional advantage of the method in accordance with the invention is that the production speed can be increased. A production speed of 200 or more packages per minute is desirable. This speed cannot be achieved when a cutting out step is required. The method of the invention however enables a speed that is far beyond 200 individual bags or other packages per minute, preferably 300 or more bags per minute or even 400 or more bags per minute.

[0015] Preferably, the transparent window extends into the adjacent side wall. As a consequence, the window material does not need to be folded three times, but merely once or twice along the fold lines. It has turned out that window material, such as polypropylene, almost without

memory is. This means that once applied, a fold has a tendency to disappear by itself. This process is undesired, because bread bags without sharp folds do not look well and because irritation and discomfort may occur during the picking up of individual bags, prior to the filling with bread. A window bag in which the window does not have three folds but merely one or two, turns out an improvement.

[0016] In a further embodiment, the transparent window is folded twice along fold lines and the paper extends on the opposed side of the window edge substantially up to one of the fold lines. Therewith it is achieved that the folds in the window are conserved well. The construction is particularly such, that the window extends below the paper. The paper thus is present between two 'layers' of window material, which apparently stabilizes the second fold in the window material.

[0017] In again a further embodiment, the side wall has in an unfolded state a width that constitutes at least 40% and preferably at least 50% of the width of the rear wall. It has turned out that a wider side wall is more effective in conserving the folds in the window well. The effective minimum width of the side wall is defined by both of the width and the length of the bag. For bread bags with a length of for instance 30 cm and a width of about 18 cm, a side wall with a unfolded width of about 6 mm is considered a minimum. However, it has turned out that a width of at least 40% gives a better result. A width of at least 50% or more is even better.

[0018] In an advantageous embodiment, a second adhesive connection is applied between the fold flap and the opposed side, wherein the second attachment is such positioned, that it adheres the strips of the side walls to the opposed side. Herewith, the package is strengthened significantly and therewith made suitable for larger and/or heavier bread. It is moreover an advantage of this embodiment that the two adhesive connections between fold flap and opposed side can be obtained in a single adhering step. This single adhering step may consist of the application of adhesive, and immediately thereafter the pressing. It is however preferred that the adhesive has been applied on the package earlier, and that the adhesive is activated after folding the fold flap by means of pressure and/or temperature, so as to form the desired attachment.

[0019] Preferably, the adhesive connection is made by application of glue. Other adhering processes, such as particularly a thermal connection (sealing or welding) are not excluded. It is not necessary that the adhesive has been applied as a strip or line of glue that extends over substantially the entire width of the package. It is sufficient when an adhesive connection is formed between the side walls and the opposed side. Nonetheless, the application of a strip or line of glue extending on the protruding step results in extra adhesion.

[0020] Preferably, the strip or line of glue is applied on one of the sides, and more preferably on the rear wall, wherein the fold flap is turned from the front to the rear

wall. Preferably, the same type of glue is applied for the first and the second adhesive connection, in order to render production as simple as possible. Nonetheless, it may be advantageous, particularly with a continuous window in the front wall, that different types of adhesive are applied, in which each type of adhesive is specified in view of the adhesive connection to be made. The strip or line of glue may further be designed up to desire. It is not needed that the strip or line is uninterrupted; a series of dots or stripes constitute a viable option, also when the glue will flow out during contact between the respective side and the fold flap.

[0021] The intermediate step defined with the separation line preferably has a width corresponding to a side wall. In a further embodiment, the intermediate part may have the shape of one or more intermediate steps. This ensures, that the side walls at the second, open or openable end of the package have the same height, which looks nice. Moreover, this enables an advantageous production process, wherein the separation line is applied prior to folding the paper, but the effective separation of the sheets, which are indicated by means of the separation lines, occurs only after folding of the paper. The effective separation occurs herein by pulling the paper. By arranging the steps, at least substantially, perpendicular to the main direction, tearing outside of the separation lines is avoided as much as possible. The use of steps rather than intermediate pieces is desired in view of the production process.

[0022] In a further embodiment, the paper present in the protruding step at the rear wall is provided with one or more suspension means. These suspension means are configured for suspending the package to a mounting means of a packaging apparatus for the industrial packaging of objects, particularly (again) bread. Non-limitative examples of mounting means are bars, ropes and brackets. The means in the rear wall is for instance one or more holes. Preferably, these one or more holes, for instance two holes, are arranged so close to an upper edge of the sheet that the holes tear out under an applied force. The location of the one or more holes in the protruding step is chosen such, that the holes tear out, when the object to be packaged, particularly bread, falls into the package.

[0023] It is an advantage of the invention that wider side walls may be applied in combination with the suspension means, in particularly two holes. These are typically arranged on a predefined distance from each other. The known production process for bread bags results therein that the side walls extend adjacent to the holes. Since the distance between the holes is predefined, this configuration limits the width of the side walls. According to the invention, the side walls are no longer arranged adjacent to the suspension means. The side walls may therefore be chosen to have a larger width and may extend to below the suspension means.

[0024] In again a further embodiment, a side flange is provided during folding of the paper. This is arranged to

a first side edge of the paper. The side flange demonstrates an overlap with the paper at a second side edge, which was arranged opposite the first side edge prior to folding. Subsequently, the side flange is adhered to the sheet close to the second side edge, resulting in an overlap. The provision of a side flange is a suitable method for forming of a robust bag. The side flange is preferably attached to the front wall or the rear wall.

[0025] Advantageously, subdividing the paper into sheets occurs in a first step and a second step, wherein the first step occurs prior to folding of the paper and the second step occurs thereafter. The separation line is defined in the first step. Preferably, the separation line is embodied by perforation of the paper. It is furthermore feasible to provide the paper with a score line. In a second step, the sheets of paper are separated along the separation line.

[0026] According to a further embodiment, the perforation of the paper is carried out by means of a perforation unit provided with perforation means for each of the steps to be defined. Preferably, use is made of three perforation means arranged parallel to each other. The perforation means are preferably knives, and more preferably knives provided with teeth. The teeth allow obtaining a perforation rather than that the paper is cut through in its entirety. Alternatively, use may be made of a means for the application of a score line. Such a means is more particularly a knife with a predefined sharpness and strength towards the paper. In a further embodiment, the separation line may be embodied as a combination of perforations and a score line.

[0027] The perforation unit is preferably configured to be arranged in a cavity of a roll. This has the advantage that the perforation unit may be mounted to the roll in a relatively easy manner. When different types of packages are to be made subsequent of each other, the perforation unit may be taken out of the cavity and be replaced by another perforation unit. Replacement of the perforation unit is also feasible, without much loss of time, upon wear of the perforation means, i.e. knives with teeth. The cavity and the perforation unit are thereto provided with mounting means, so as to prevent that the perforation unit will fall out of the roll or would vibrate during rotation of the roll. It is in fact desired that the roll will rotate at high speed, so as to carry out sufficient perforations per minute. A variety of mounting means are known to the skilled person. Examples are magnets, one or more protrusions fitting in complementary holes ("lock & key"), and if so desired, being able to be mechanically or electronically locked or anchored, mechanical connection means, such as one or more screw connections, etc.

[0028] Such a perforation unit has particularly such dimensions, that it extends over the entire width of a sheet. The one or more knives are herein fixed and extend substantially in correspondence of the shape of the separation line. The knives are at least largely arranged perpendicularly to the sense of revolution of the roll and are arranged in accordance with the pattern of the steps.

Particularly, it relates to a first, a second and a third knife, that are substantially arranged - in a perpendicular top view - on lines parallel to the second knife on the intermediate line. Moreover, the knives are shifted mutually in the width direction of the sheet. The knives can be arranged in parallel planes. It is however preferable that the first knife and the third knife are arranged in planes that are oriented with respect to the plane through the second knife, somewhat to the outer side. This ensures that the first and the third knife extend radially, after mounting of the perforation unit in the roll, and therewith transversal to the paper that is led along the surface of the roll. The diversion of the knives is for instance in the order of 0-5 degrees with respect to the plane through the second knife. The roll has herein preferably a cylindrical shape.

[0029] The knives can be of the same type or may be mutually different. With a type of knife, reference is made herein to the choice of the material, height and width of the teeth, sharpness of the tooth tip, distance between the center line of adjacent teeth. The knives are herein mounted in a suitable manner in a head, for instance by clamping by holding parts, such as metal bars. More preferably, the second knife is arranged at an elevation relative to the first and the third knife. It is desired to obtain an appropriate perforation of the second knife. This elevated position particularly ensures that the radial distance of the knife teeth to the center of the roll - after assembly - is substantially equal.

[0030] Preferably, the perforation unit is arranged in a cavity in the roll. This has the advantage that the perforation means get in contact with the paper during the revolution of the roll, and not merely at a single instance. The longer contact duration contributes that the perforation can be realised along the entire separation line as desired. A second roller may be positioned opposite the said roller, in a manner wherein the paper moves in between the two rollers. The first and second roller rotate thereto in mutually opposed senses of revolution. The second roller preferably comprises a material with sufficient elasticity at its surface, such as a rubber-type material.

[0031] In a further embodiment, transverse knives are applied in addition to the knives mentioned above, so as to provide perforations between the steps. These transverse knives maybe of another type than the first, second and third knife, that are preferably of the same type.

[0032] The separation of the sheets preferably occurs by simultaneous holding back the paper and pulling on it. The pulling occurs on one side of the separation line, particularly on the sheet to be removed. The holding back of the paper occurs on the other side of the separation line. In an advantageous embodiment, the holding back of the paper is a step wherein the continuously moving paper, originating from a roll, is delayed. In a further embodiment, the pulling is carried out with a pulling agent, wherein the continuously moving paper is accelerated. More preferably, use is made of an apparatus that is pro-

vided with a first and a second rotatable shaft, wherein the paper is lead between a carrier and the shafts. The shafts are arranged in a width direction of the paper. The second shaft is arranged downstream of the first shaft. A conductor belt may be present, which contacts the top side of the paper and also with the second shaft. The pulling force is herein provided in that the rotation speed of the second shaft is increased temporarily, whereas the rotation speed of the first shaft is decreased temporarily.

[0033] The term 'paper' as a material from which the package is manufactured, has been used hereinabove in a broad sense. It is furthermore feasible that the paper is provided with a polymer layer at the inner side of the package. In again a further embodiment, the paper is provided with a coating on the outer side, with which the water permeability is defined. The latter is desired for bread with a hard crust and is very common in among others the Belgian market. Preferably, such a coating is based on a vegetable oil, although paraffine is suitable as well.

[0034] The package according to the invention is particularly suitable as a bread bag. More particularly, it relates to a bread bag that is configured for the industrial packaging of bread, wherein the package is hung with a suspension means to a mounting means of an apparatus - i.e. a filling apparatus, wherein a bag is blown open with a gas, particularly, compressed air, in a first step, and wherein a bread falls into the blown open package in a second step. By blowing open, the known package turns out to be deformed to such an extent that apertures are formed on the bottom side, through which crumbs may leave the package. With the package according to the invention, this problem has been solved. That is particularly, but not exclusively important for packages provided with a window, that with further preference is continuous over the full length of the package.

[0035] Nonetheless, a package according to the invention is also foreseen to be suitable for other objects than bread, particularly for the industrial packaging in a bag-shaped package of one or more of such objects, such as other foodstuff, including vegetables and fruit. Examples are for instance lettuce, endive of such crops, and furthermore tomatoes, paprika, cucumbers and aubergines. A paper bag is a suitable package for fruit too. Paper can be recycled and is a natural product that by no means would lead to transfer of plasticizers or other compounds to the ingredients of the bag. Moreover, the water permeability may be tuned by means of coatings, typically based on oil, and through the choice of the paper, which is beneficial for the conservation. Furthermore, a bag-shaped package according to the invention is suitable for packaging a plurality of items of one and the same type vegetables or fruit. This seems commercially attractive, because a consumer gets offered in a suitable manner a combination of crops, with which he can prepare a dish after returning home. It is not excluded that at least part of the crops has been pre-treated, i.e. has been

cleaned and/or cut. The invention may thus provide a solution for these applications. Application for other objects than foodstuff is not excluded.

5 Brief introduction of the figures

[0036] These and other aspects of the invention will be further elucidated with reference to the following figures, which are not drawn to scale and are purely intended as illustrations, wherein same reference numerals in different figures refer to equal or corresponding part and wherein:

- Fig. 1 shows a sheet leading to a bread package according to the prior art;
- Fig. 2 shows a roll of paper with perforations in accordance with the prior art;
- Fig. 3 shows a first and a second sheet, partially, according to the prior art after separation in accordance with the perforations shown in Fig. 2;
- Fig. 4 shows a sheet leading to the bread package in accordance with the invention;
- Fig. 5 shows a roll of paper with a perforation leading to the sheet as shown in Fig. 4;
- Fig. 6 shows in a schematical side-view a machine with which the roll of paper of Fig. 5 can be separated into individual sheets, and
- Fig. 7-9 show examples of sheets leading to the bread package of the invention, in which the window has been indicated.

Detailed description of illustrated embodiments

[0037] Fig. 1 shows a sheet 10 leading to a bread package that is known per se. The sheet is provided with a first end 11 and a second end 12 in a first direction (also referred to as main direction), and furthermore a first side edge 13 and a second side edge 14 in a second direction. The main direction is moreover the direction along which the paper is unrolled, as will become apparent based on Fig. 2. The paper is thus subdivided into sheets 10 along the first and the second end 11, 12. Thereto, the first and the second end 11, 12 may be pre-treated, in order to enable an efficient and substantially perfect subdivision.

[0038] Shown in Fig. 1 are those parts of the sheet 10 that constitute specific elements of the bread package after folding. They are indicated with the name of the element of the bread package, such as front wall 1, rear wall 2, side walls 3. These elements are defined by fold lines 15. The sheet as shown in Fig. 1 is furthermore provided with a side flange 4. After folding along the fold lines 15, this side flank 15 will be arranged opposite the rear wall 2. Therewith, side flange 15 and rear wall can be adhered to each other, for instance with an adhesive connection.

[0039] The sheet 10 includes a basic step 16 and a protruding step 18 in the main direction, which is shown in the figure upwards. Due to the cutting manner of the

sheet the protruding step 18 at the first end 11 corresponds with a basic step 16 at the second end 12; the sheet is staggered. The protruding step 18 has a height h_1 relative to the basic step 16. The protruding step 18 is provided on the rear wall 2, defined at the second end 12, with suspension means 26. This is in itself not necessary, but desired for the use of the bread package in the industrial preparation and packaging of bread. It is therein common that a bread package is suspended with the suspension means 26 on one or more hooks or otherwise corresponding means of a packaging apparatus. The bread package is thereafter typically blown open with compressed air, after which an often cut bread is guided into the package. The practice is that the bread falls into the package, though another configuration is not excluded.

[0040] The rear wall 2 is furthermore provided with a tear line 22. The step 18 that is provided with suspension means 26, may be removed after the filling of the bread package with bread. It is even possible that this removal - particularly tearing off - occurs under the impact of the weight of the bread in the bread package.

[0041] It is desired for the manufacture of the bread package that the bottom side of the package is robust and closed. Thereto, a fold flap 20 of the sheet 10 is folded along a fold line 21, after that the sheet has been folded earlier along fold lines 15. The fold line 15 is arranged close to the first end 11, and is arranged such that at least the protruding step 18 is folded over in its entirety. In the example of Fig. 1, the fold line is defined, when seen in the first direction, beyond the basic step 16, such that the rear wall 2 is also folded over partially.

[0042] The location of the fold flap 20 after folding is shown in Fig. 1 as a shaded area with reference numeral 20'. Two portions are visible: the fold flap 20' as such, and strips 25. These strips 25 are effectively the folded over strips of the sidewalls. The fold flap 20 comprises in those areas three layers of paper. To the extent that the rear wall 2 is folded over, an extra layer of the folded over strip of the rear wall 2 is added thereto. The fold flap is attached to the rear wall 2 with an adhesive connection 23, in this example in the form of a line. This package has the disadvantage that bread crumbs may move in between of the fold flap.

[0043] A second disadvantage of the package in accordance with Fig. 1 is that this is not suitable for the provision of a window. Such a window is present at the front wall 1, and is connected with the sheet with adhesive connections in the main direction. The folding over of the window with an adhesive connection in a fold flap however leads to loss. Moreover, there is a risk that the adhesive connection along the window may get disconnected. That is completely undesired.

[0044] Fig. 2 and Fig. 3 demonstrate an alternative production method for a bread package. Fig. 2 shows a roll of paper 90, with separation lines 30, 30'. The arrows indicate herein the main direction along which the paper is unrolled. Fig. 3 shows resulting sheets 10, 10' and their

mutual orientation. It is noted that merely a portion (about half) of each of the sheets 10, 10' is shown in Fig. 3. The protruding steps 18 are in this production method mutually not staggered, but they are opposed, with the consequence that part of the paper 31 need to be cut out. These part of the paper are the cut out parts 31.

[0045] Fig. 3 shows the situation after the cutting out step. It is clear that the front wall 1 falls apart into two strips. These strip, on the side edges, are mutually connected through the window, which is not shown in this figure. It is however preferable that the window is attached to the paper on one side prior to the subdivision of the paper roll 90 into sheets 10, 10'. The fold flap 20 is herein arranged on the rear wall 2 and is folded over along fold line 21 and attached to the front wall 1. In this example, the fold flap 20 extends even further in the main direction. This ensures that the fold flap is closed effectively, while the adhesive connection is applied on or opposite the protruding step 18. This bread package has the disadvantage that the cutting out step is laborious.

[0046] Fig. 4-5 shows the bread package in accordance with the invention and the manufacture thereof, in a first embodiment. Fig. 4 shows the sheet 10. Fig. 5 shows the paper roll 90 with initial perforation. The shown first embodiment is a version without window. Fig. 7-9 show versions with a window. It turns out from Fig. 4 that the front wall is arranged to the first side edge 13. A window that extends from the first end 11 to the second end 12 in the main direction, can be added in easily. Also in this case, the window need to the folded over, but the adhesion with the rear wall is much more appropriate.

[0047] Extending from the first to the second side edge 13, 14 and mutually separated by fold lines 15, the sheet 10 in the shown embodiment comprises a front wall 1, a first side wall 3 and a rear wall 2, a second side wall 3 and a side flange 4. This side flange 4 is advantageous but not strictly necessary and may be arranged at another location, for instance opposite de side walls 3. The latter may even be beneficial for the stability of the package. According to the invention, the ends 11, 12 are provided with an intermediate step 17, in addition to a basic step 16 and a protruding step 18. The intermediate step 17 has a second height h_2 relative to the basic step 16 on the first end 11. The protruding step 18 has, on the first end 11, a first height h_1 relative to the basic step 16 and a third height h_3 relative to the intermediate step 17. The third step h_3 is preferably chosen to be sufficiently large to ensure a stable adhesive connection between the protruding step 18 (defined in the front wall 1) and the rear wall 2, after folding over of the fold flap 20. More particularly, the stable adhesive connection is a second strip of adhesive, at a height where the protruding step 18 protrudes beyond the intermediate step 17. Therewith, the front wall 1 is adhered to the rear wall 2. Instead of a second strip of glue, one may choose another pattern, such as a plurality of individual dots of glue (instead of an uninterrupted line). It is furthermore feasible that the second adhesive connection is designed as a first block

and a second block, and particularly on positions corresponding to the strips 25 formed by folding over the side walls. This application occurs more particularly on the rear wall 2. Preferably, use is made of a single apparatus provided with a stamp for the printing of the sheet (here the rear wall 2) with the first and the second adhesive connections. In this manner, the number of steps is limited as much as possible.

[0048] During the manufacture of the bread package, the sheet is first folded along the fold lines 15, after which the sheets is folded over along fold line 21 extending in the second direction. The resulting fold flap 20 is subsequently adhered to an opposed wall, in this case the rear wall 2. Strips of the side walls 3 are folded over therewith. According to the invention, use is made of a first and a second adhesive connection 23, 24, which are strips of glue in this example. With the first adhesive connection, the strips 25 are attached to the rear wall 2. The continuation of the adhesive connection of the strips 25 to the fold flap 20 ensures moreover, that also the sides of the strips are sealed.

[0049] The basic step 16, the intermediate step 17 and the protruding step 18 have each a fixed height in the shown embodiment. It is not excluded that the height of the intermediate step 17 varies over the width. This has however as a disadvantage, that the intermediate step on the second end 12 will vary in height as well. This is not appreciated by customers. It is feasible in this design that the fold line 21 coincides with the basic step 16. In order to avoid loss, it is preferred to provide some tolerance.

[0050] It is observed that bags that have an intermediate step in addition to a basic step and a protruding step, are known per se in the field of packaging, for instance from US2,582, 286, published on 15 January 1962. The intermediate step is arranged after the folding over in the side walls. The known bag has reduced risk on leakage of powdery material via the bottom corners of the bag, which is more particularly provided with a so called square bag bottom). This traditionally relates to packages for farine and the like, wherein there is no need or desire for a window.

[0051] Moreover, use is particularly made of paper comprises a cellulose layer and a cover layer for the bread packages of the invention. The cellulose layer comprises often a mixture of long fibers and short fibers, with particularly at least 40% long fibers, and more preferably even 70% long fiber. Long fiber cellulose originates from coniferous trees. The cover layer comprises, in a more preferred embodiment, a vegetable oil and has a weight of 1-10 g/m², such as 4-10 g/m² or 5-8 g/m². This renders the package suitable for recycling, i.e. such that the bag may be processed in a paper purification treatment, such that for the remaining pulp of recycled fibers new paper from recycled fibers of acceptable quality may be produced. In a further embodiment, use is made of a dispersion glue as the glue for the adhesive connection of the fold flap. Such dispersion glue is also

known as a cold glue, which is desired to meet the requirements of recycling and of composting ability, particularly of composting ability at home, more particularly as part of a compost heap with waste of vegetables, fruit and/or garden waste. If desired, the cellulose layer may be provided with a lime layer, wherein the cover layer is present at the side of the lime layer. As a consequence, the cellulose layer will have a more closed structure at that side. Alternatively or additionally, the cellulose may be glazed by means of a machine on one or on both sides. If one of the sides of the cellulose layer is glazed by a machine, the cover layer is preferably present on the machine glazed side.

[0052] Fig. 5 shows the paper roll 90 prior to the separation process to individual sheets 10, 10'. This figure demonstrates that a cutting out step is not needed for removal of portions of the paper. Fig. 6 shows an apparatus 100, with which the paper 90 can be separated into disconnected sheets 10 along a separation line 30 with a basic step 16, an intermediate step 17 and a protruding step 18. The paper is in the shown side view led from the right hand side and leaves the apparatus on the left hand side as disconnected sheets 10. The paper is present on a carrier 120. The disconnected sheets 10 are carried away by means of a belt 130. Instead of a belt 130, another transport means can be applied, such as a roll. It is however an advantage of the roll, that the sheet 10 may be guided away in a specific, predefined direction. Preferably, this is an upwards direction, wherein the angle between the carrier 120 and the belt 130 is for instance smaller than 45 degrees. In the shown embodiment, the angle is in between of 20 and 40 degrees. 30 Degrees is a good choice, but alternative embodiments with an angle between 10 and 20 degrees are feasible.

[0053] In the apparatus 100, paper 90 is guided over the carrier 120 by means of a pulling means 110. This pulling means is more particularly a conductor belt. The paper is present therein between the carrier 120 and the conductor belt 110. This conductor belt is, in one practical embodiment, closed and runs along a plurality of shafts 111, 112, 113. The driving of the conductor belt 110 occurs with a number of these shafts 11-113, particularly the first shaft 111 and the second shaft 112. It is otherwise not excluded that one of the further shafts 113 would take over and/or strengthen the role of the first shaft 111. According to this embodiment of the invention, the driving of the second shaft 112 and/or the first shaft 111 is controlled such, that in a first period - the separation period - the second shaft 112 rotates quicker than the first shaft 111. Therewith, a force is applied onto the paper 90, leading to tearing along the separation line 30. During a second period - the transport period - the second shaft 112 rotates with equal speed as the first shaft 111. The process has especially been tuned such that the separation line 30 is arranged in the portion between the first shaft 111 and the second shaft 112. For the controlling, use made be made of a control unit and if needed one or more sensors. The control unit is therein configured for

the setting of the drive speed of the first shaft 111 and/or the second shaft 112.

[0054] Fig. 7 shows a first embodiment of a sheet 10, resulting in a bread package of the invention, wherein the window is indicated. The window is present at the second side edge 14. In the shown example, the window is continuous from the protruding step 18 (at the first end 11 of the sheet 10) up to the intermediate step 17. In the area 51 that is shown as doubly shaped, the window 50 overlaps with the paper. The window 50 is thus not visible. Nonetheless, it is also feasible to limit the area of overlap in width or to shift towards the rear wall 2. An adhesive connection - not shown - is present to adhere the paper with the window material. The adhesive connection extends preferably parallel to the fold lines 15. After folding, there is one fold in the window, particularly at the transition of intermediate step 17 to the protruding step 18. The second side edge 14 is connected to the first side edge 13 under formation of the wrapper. It is observed for sake of clarity that the paper extends from the overlap area 51 up to the first side edge 13. The bag may thus be manufactured from a substrate comprising a single lane of paper and a single lane of transparent window material.

[0055] Fig. 8 shows a second example of a sheet 10. Herein, the window extends to beyond the fold line 15 in the middle of the side wall 3. The window 50 is thus twice folded. The overlap area 51 is present beyond the said fold line 15. This implies that the paper is present, after the folding, between a first and a second portion of the window material. It has turned out that this resulting in stabilisation of the fold, notwithstanding that the window material, for which for instance polypropylene has been applied, is without memory and has the tendency to unfold by itself.

[0056] Fig. 9 shows a third example of a sheet. Herein, the window extends to beyond the fold line 15 that separates the side wall 3 from the rear wall 2. Such a package seems for instance advantageous for bread or pieces of bread of smaller size. The tendency to unfolding may herein be limited, as in the examples shown in Fig. 7 and 8, in that the width of the side wall in unfolded state is at least 40% of the width of the rear wall 2, and preferably at least 50%. For adhering the strip 25 preferably use is made of a cold glue, i.e. a glue that does not need to be heated. It has turned out that a cold glue suitable for the window material is also applicable for an adhesive connection between twice paper. It is suspected that this is partially due to the presence of a cover layer on the paper, that renders the paper hydrophobic and therewith more similar to the hydrophobic material of the window. This example is however less advantageous, particularly in combination with the suspension means 26. These suspension means are defined into the sheet after the folding and adhering of the substrate into a package. If the window material extends to close to the area of the suspension means 26, this may lead to loss during the application thereof. If the package does not contain suspension

means 26, it is furthermore feasible that the second side 12 of the sheet 10 is folded over rather than the first side.

5 Claims

1. Bag-shaped package consisting partially of paper and comprising a transparent window, particularly for bread, comprising a front wall (1) and a rear wall (2), both of which - when seen in a main direction - are provided of two ends (11, 12) and two side, between which sides of the front and the rear wall (1,2) side walls (3) are present, wherein:

- the package is suitable at its second end (12) for moving in and out of an object such as bread;
- the package is closed at the first end (11) by means of a fold flap (20), formed by folding over of a protruding step (18) that extends in the main direction over a first height (h1) and that protrudes relatively to a basic step (16) and is present on the front wall (1) and after folding over is adhered to the rear wall (2) with an adhesive connection (23, 24);

- the fold flap (20) is defined such that a strip (25) of the side walls (3) is folded over together with the fold flap (20), which strip (25) has a second height (h2) in the main direction relative to the basic step (16) and on the first end (11), which second step (h2) is smaller than the first height (h1),

- the transparent window that is continuous in the main direction is connected along a side edge to the paper, which side edge is present in the front wall (1) and wherein the transparent window extends up to a window edge defined in the adjacent side wall (3) or on the rear wall (2).

2. Package according to claim 2, wherein the transparent window extends into the adjacent side wall (3), and wherein preferably the transparent window is twice folded along fold lines (15), and the paper extends on opposite side of the window edge to substantially one of the fold lines (15).

3. Package according to one of the claims 1-2, wherein the side wall in unfolded state has a width that is at least 40% and preferably at least 50% of the width of the rear wall (2).

4. Package according to claims 1-3, **characterized in that** the adhesive connection (24), preferably made of a glue material, is positioned such that it connects the protruding step (18) with the other wall (2) over substantially the entire width of the package.

5. Package according to claim 4, **characterized in that** a second adhesive connection (23) is present be-

tween the fold flap (20) and the opposed wall (2), which second adhesive connection (23) is positioned such that it adheres the strips (25) of the side walls (3) to the opposed wall (2).

6. Package according to one of the claims 1-5, wherein the paper extends from the window edge to the side edge and consists of a single sheet of paper.
7. Package according to one of the claims 1-6, **characterized in that** a protruding step (18) is present at the second end (12) of the other wall (2), that is provided with at least one means to hang the package on one or more mounting elements of a machine.
8. Method for the manufacture of a bag-shaped package comprising:
 - Providing a substrate with a first and an opposed side edge (13, 14), which side edges are mutually separated over a width of the substrate, which substrate consists partially of paper and is provided with a transparent window that is continuous in a main direction, wherein the transparent window is present at the second side edge (14) and is adhered to the paper at an opposed window edge;
 - Subdividing the substrate in sheets along uniform separation line extending over the width and on a predefined distance from each other in the main direction, wherein the separation line defines a pattern with a basic step (16), an intermediate step (17) and a protruding step (18) that protrudes in the main direction relative to the basic step (16) over a first height (h1), which intermediate step (17) has at a first end (11) of the sheet a second height (h2) in the main direction relative to the basic step (16), said second height (h2) being smaller than the first height (h1);
 - The folding of the substrate along fold lines (15) under formation of a front wall (1), a rear wall (2) and side walls (3), wherein the fold lines (15) are defined such that the protruding step (18) on the first end (11) of the sheet is arranged in the front wall (1), and the protruding step (18) on the second end (12) of the sheet is present on the rear wall (2), and the intermediate step (17) is present in a side wall (3);
 - Forming a wrapper from the sheet with a connection agent, wherein the transparent window is connected to the first side edge (13);
 - Folding over of the protruding step (18) on the first end (11) of the sheet under formation of a fold flap (20), wherein a strip (25) of the side walls is folded over together with the fold flap (20), and
 - Adhering the fold flap (20) to the opposed wall

with an adhesive connection (23, 24), therewith generating the bag-shaped package from the wrapper.

9. Method according to claim 8, wherein the first side edge (13) is present after the folding in the front wall (3), and wherein the window edge is preferably present after the folding in a side wall.
10. Method as claimed in claim 8 or 9, **characterized in that** a second adhesive connection (23) is applied between the fold flap (20) and the opposed wall, wherein the second adhesive connection (23) is positioned so as to adhere the strips (25) of the side walls (3) to the opposed wall.
11. Method according to any of the preceding claims 8-10, **characterized in that** the subdivision of the substrate occurs in two steps, wherein in the first step a perforation line is applied into the substrate and wherein in a second step, that occurs after the folding step, the sheets are mutually separated.
12. Method according to any of the preceding claims 8-1, wherein a transition of the intermediate step (17) to the protruding step (18) on the first end (11) has a curved shape.
13. Use of the package according to one of the claims 1-6 for the packaging of one or more objects, particularly bread.
14. Use according to claim 13, wherein the package of claim 7 is applied and the package is hang on one or more mounting elements of a machine, comprising to blow a gas, such as compressed air, into the bag-shaped package and to make fall of the object into the blown up package.
15. Package according to any of the claims 1-7 provided with a bread.

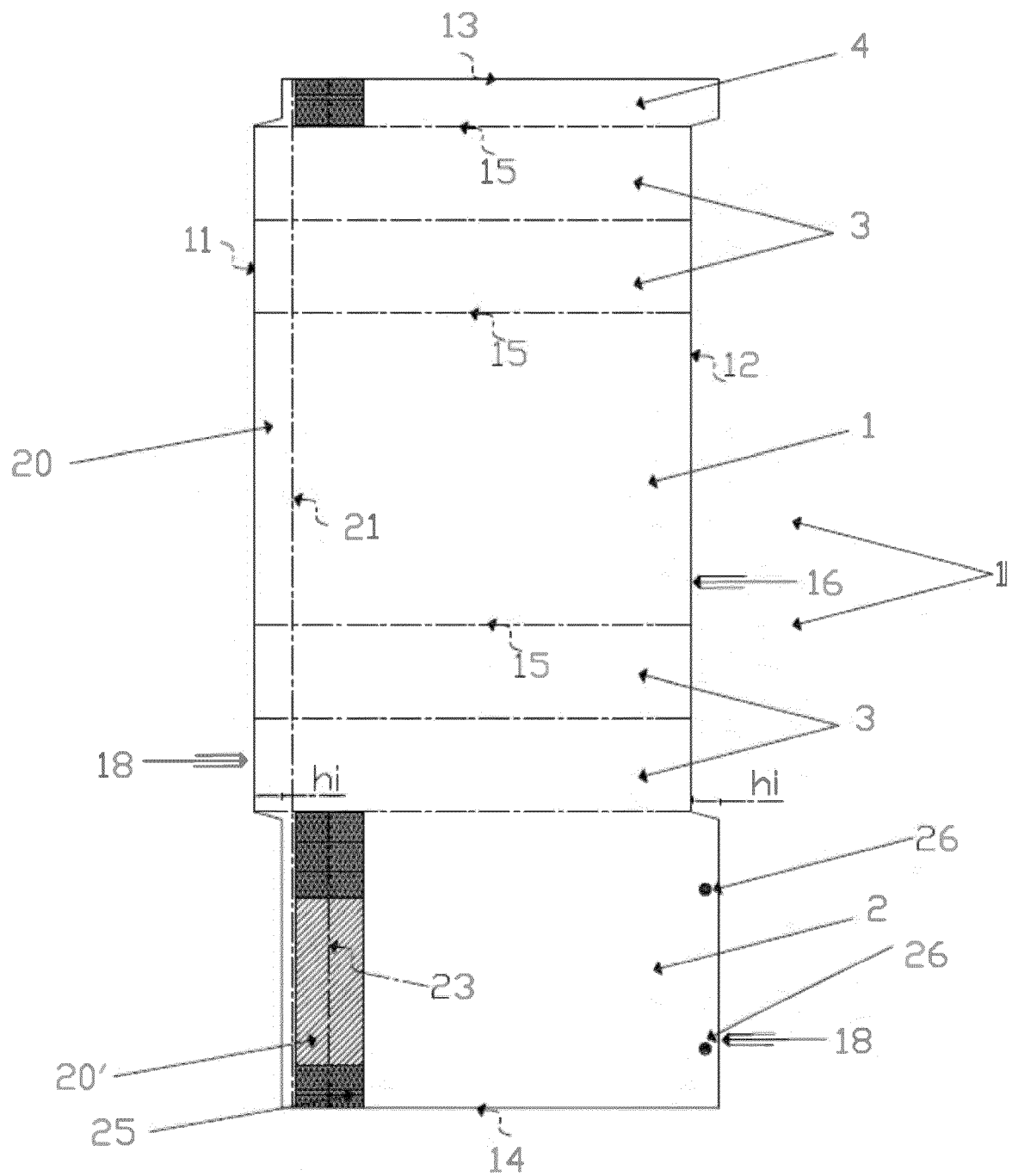


Fig. 1

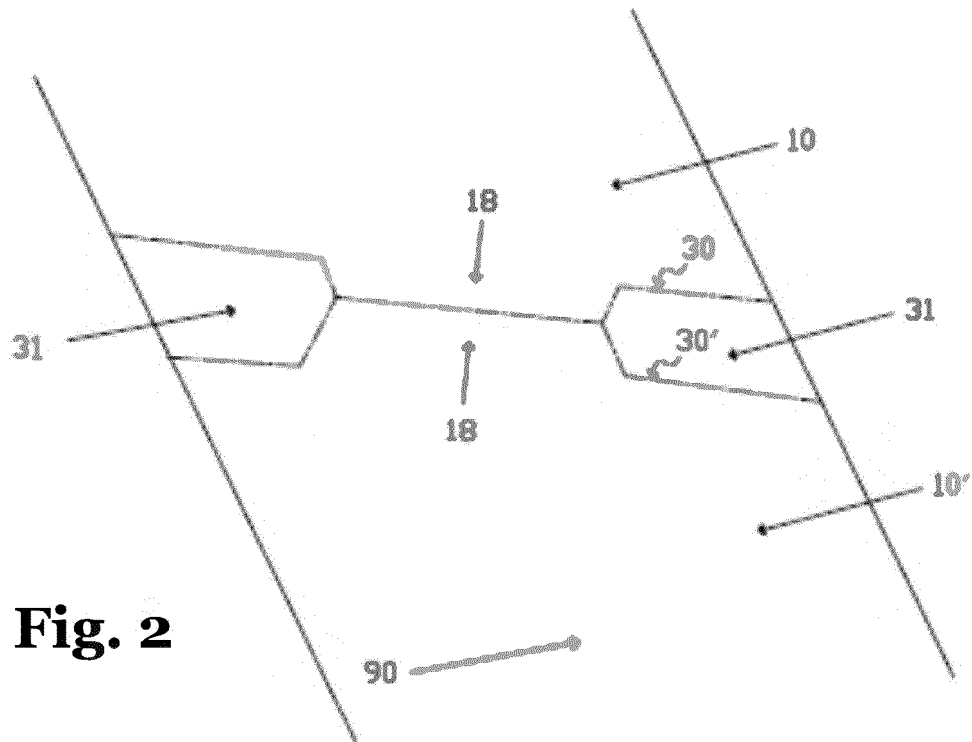


Fig. 2

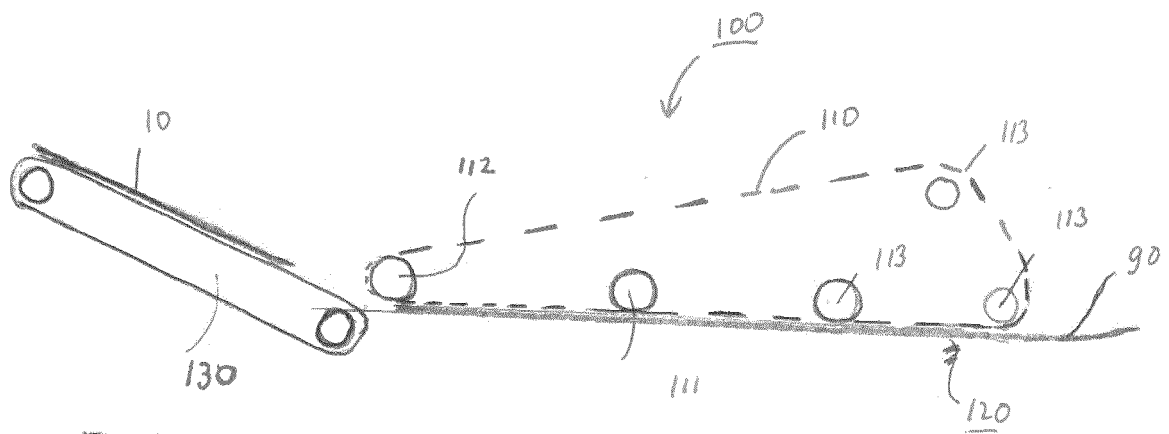


Fig. 6

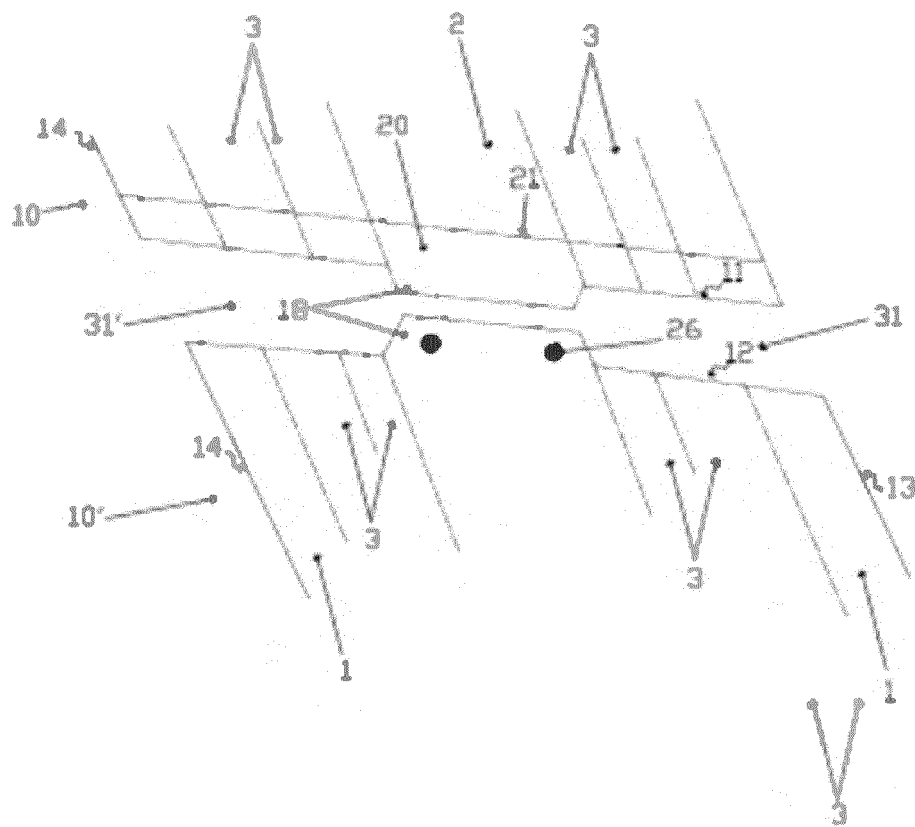


FIG. 3

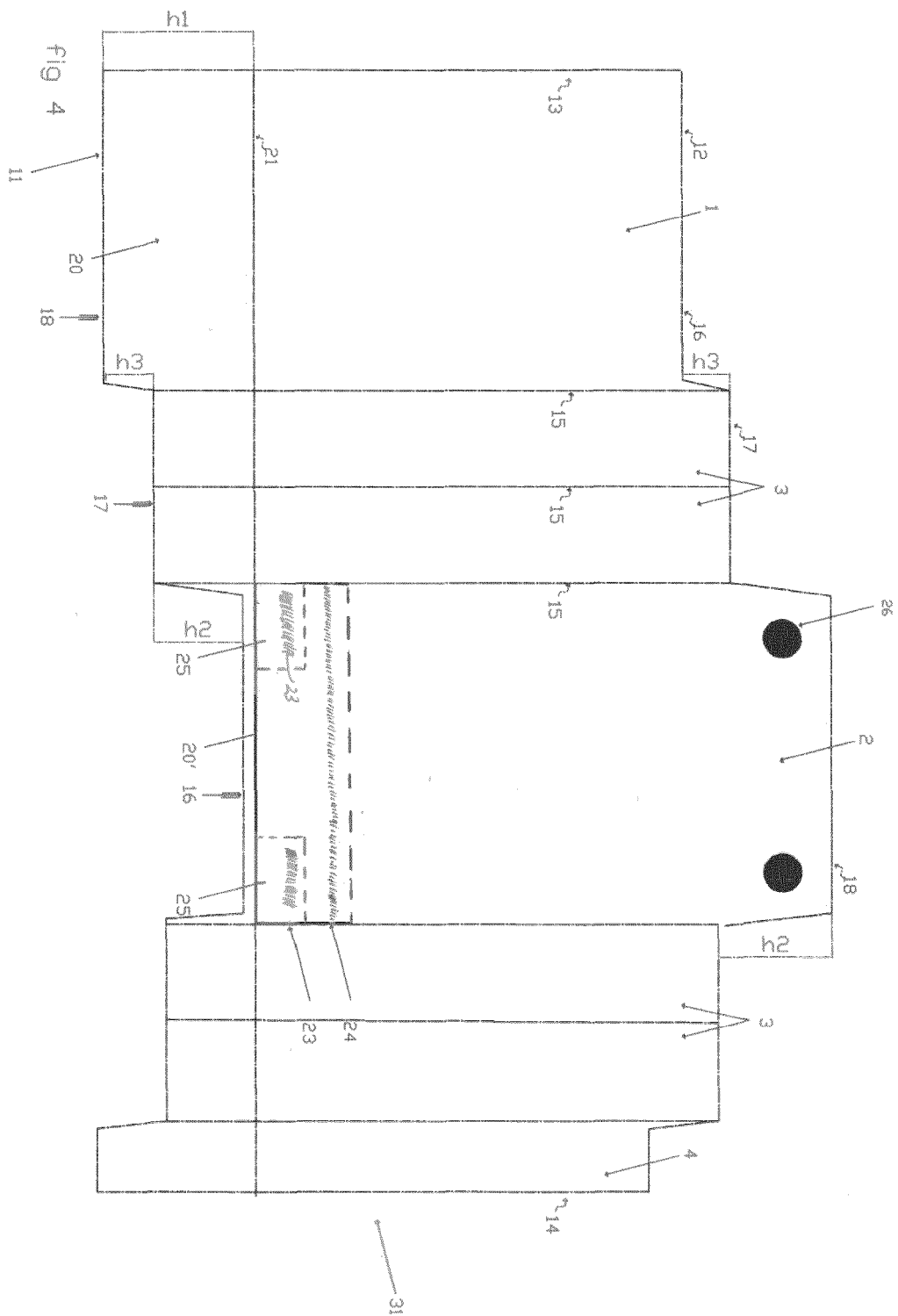


Fig. 4

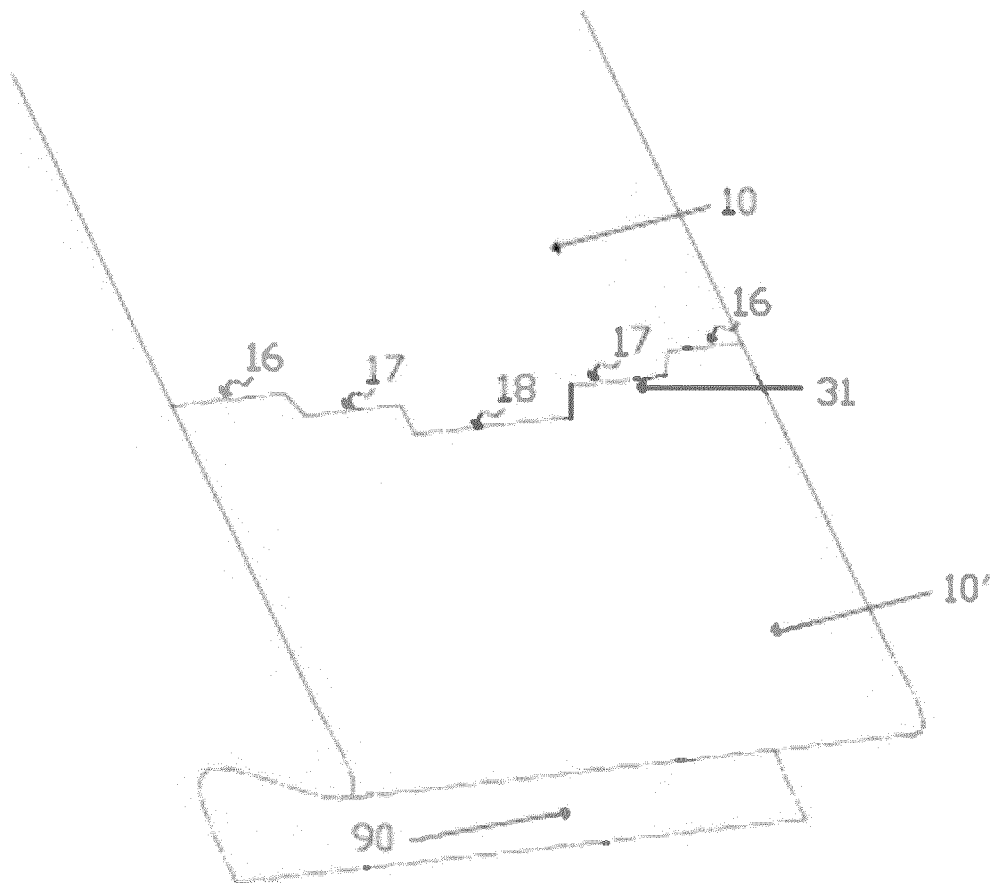


FIG. 5

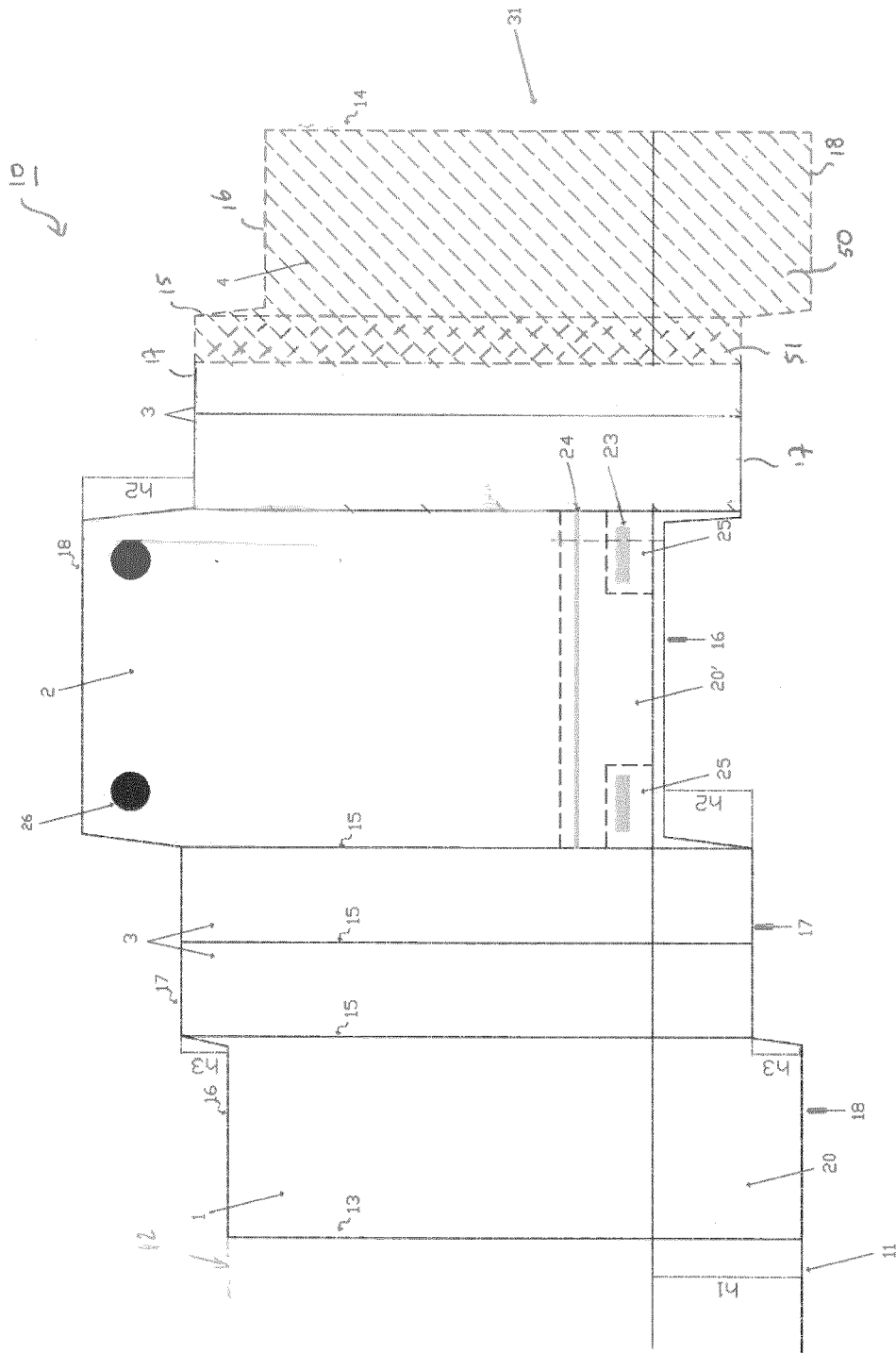


Fig. 7

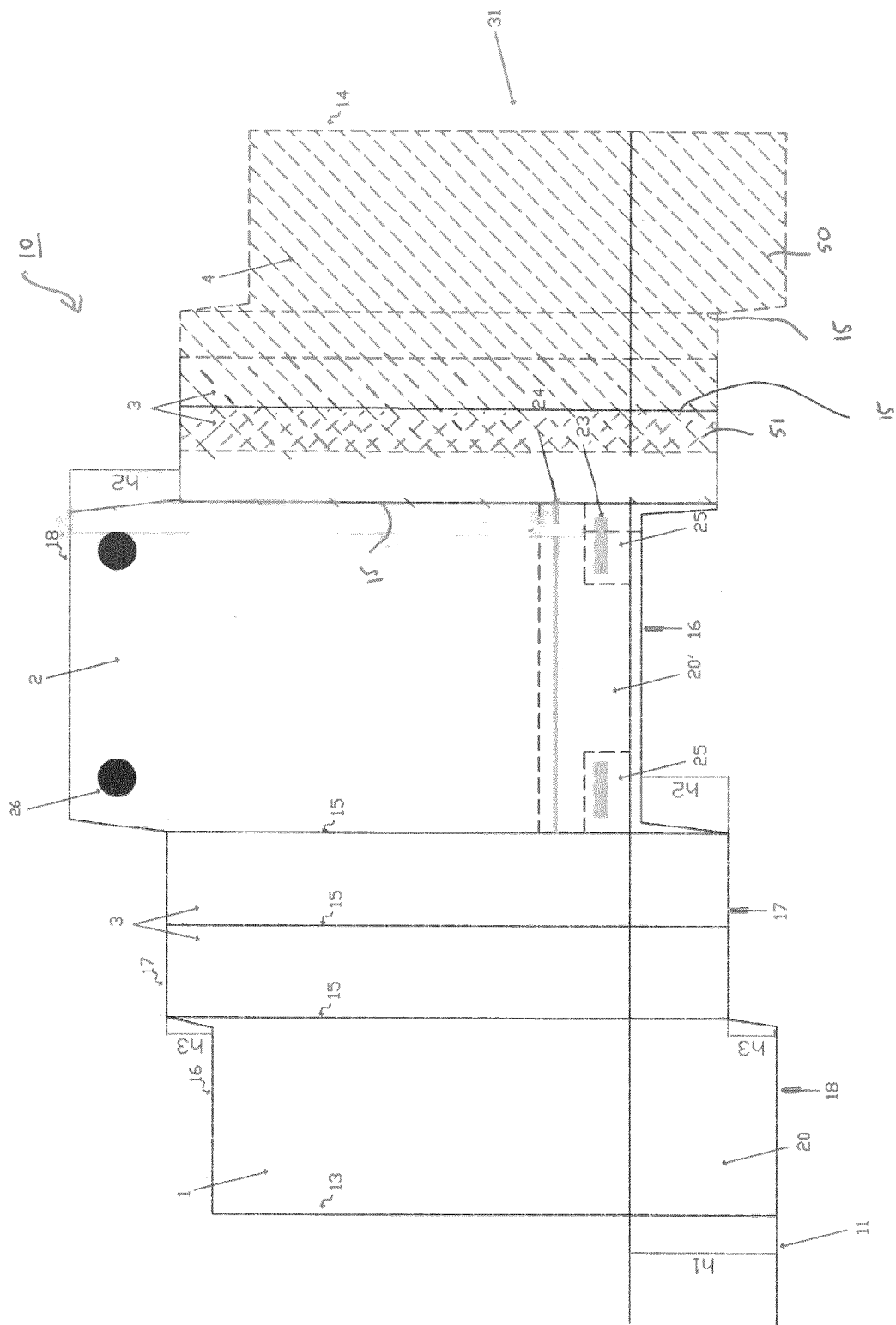


Fig. 8

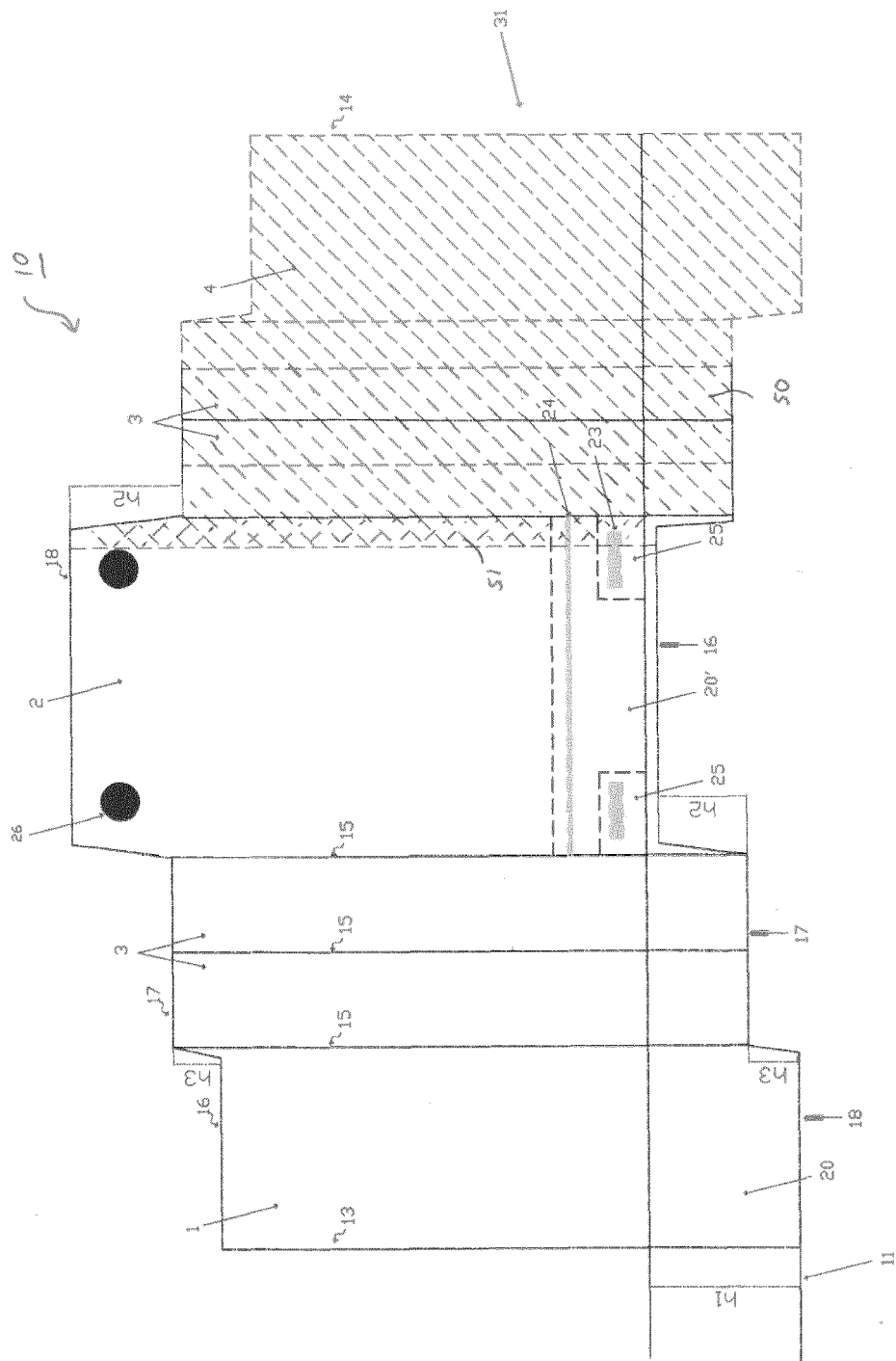


Fig. 9



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Application Number
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			B65D B31B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 September 2016	Examiner Farizon, Pascal
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13-09-2016

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