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

(11) **EP 3 248 904 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.11.2017 Bulletin 2017/48

(21) Application number: **17171928.9**

(22) Date of filing: **19.05.2017**

(51) Int Cl.:
B65D 85/804 *(2006.01)* ***B65D 85/46*** *(2006.01)*
B65D 71/06 *(2006.01)* ***B65D 81/05*** *(2006.01)*
B65B 23/20 *(2006.01)* *B65D 75/00* *(2006.01)*

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

(30) Priority: **26.05.2016 IT UA20163829**

(71) Applicant: **Granitifiandre Societa' Per Azioni**
42014 Castellarano (RE) (IT)

(72) Inventors:
- **MARCHI, Domenico**
  42031 BAISO (RE) (IT)
- **ALBERTINI, Claudio**
  53048 SINALUNGA (SI) (IT)

(74) Representative: **Corradini, Corrado et al**
Ing. C. Corradini & C. S.r.l.
Via Dante Alighieri 4
42121 Reggio Emilia (IT)

(54) **PACKAGE, PACKAGING METHOD AND PLANT**

(57) Package, packaging method and plant for making a package, comprising: an article (100) having two opposite faces (105, 110) and a plurality of flanks, of which at least a front flank (115), a rear flank (120) and two lateral flanks (125, 130); at least two protective bands, of which a first protective band (205) for covering the front flank (115) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110), and a second protective band (210) for completely covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) in areas left uncovered by the first band (205); and an external cladding (220) of extensible film for covering the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) and the portions of the two protective bands (205, 210) covering them.

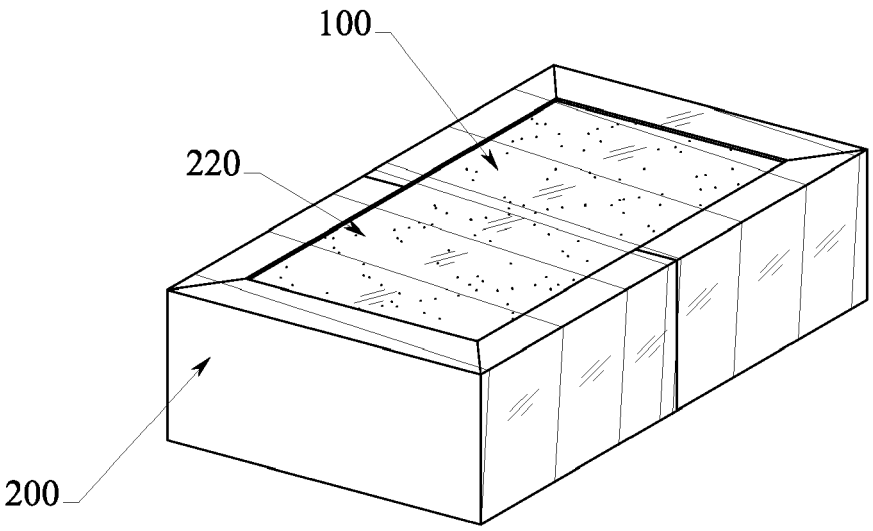

FIG.2

EP 3 248 904 A1

Description

Technical field

[0001] The present invention relates to a package, a packaging method and a plant for packaging an article, in particular of a ceramic slab or more preferably of a stack of ceramic slabs, having generally a parallelepiped shape and which has two opposite faces, typically a top face and a bottom face, and a plurality of peripheral flanks, of which at least a front flank, a rear flank and two lateral flanks.

Background art

[0002] Normally, ceramic slabs are packaged in groups of several units, where the ceramic slabs of each group are mutually superposed to form a stack which is enclosed inside a package made of cartonboard.

[0003] The package made of cartonboard is normally adapted to border the peripheral flanks of the stack of ceramic slabs, thus covering partially also the opposite faces but leaving uncovered a central portion which allows seeing the ceramic slabs from the outside.

[0004] This package made of cartonboard is usually obtained starting from a single die cut, which may be shaped like a frame which is rested on the top face of the stack and then is folded downwards over the peripheral flanks and over the bottom face, or like a continuous band which is enveloped about the peripheral flanks and simultaneously folded over the top and bottom faces.

[0005] In both cases, the use of a single die cut results in the need to modify the shape and sizes of the same each time a format is changed, thus increasing the number of die cuts to be stored in the warehouse, the processing waste and overall complicating the entire packaging process.

[0006] To at least partially obviate this drawback, a packaging system was proposed in the past that provides using two cartonboard die cuts, of which a first die cut is used for bordering the front flank and partially the lateral flanks of the stack of tiles, while a second die cut is used for bordering the rear flank and the portions of the lateral flanks left uncovered by the first die cut, on which it is at least partially superposed.

[0007] The package is closed and made stable by joining the two die cuts at the mutual superposing areas, for example by gluing or straps.

[0008] Thereby, two die cuts of equal shape and size may be used for packaging ceramic slabs also having slightly different sizes from one another by simply increasing or decreasing the size of the mutual superposing areas.

[0009] All packages made of cartonboard however have the drawback of being very susceptible to the moisture to which they are normally subjected during the storing and transport preceding the marketing thereof.

[0010] When a package gets wet, it may tear, break and/or rot, thus making the stack of ceramic slabs therein contained unpresentable in terms of marketing. The wet package may also release inks which are used to impress thereon trademarks and/or business logos, thus risking to soil or stain the ceramic slabs. Not lastly, in order to fold the cartonboard cutting dies over the stack of tiles, said cutting dies are to be divided into flaps or strips by means of scorings, which are intended to be positioned at the corners of the stacks. The cartonboard along these scorings is crushed and therefore les suitable for protecting the tiles, resulting in such tiles risking to be damaged more easily during transport.

Summary of the invention

[0011] In light of that disclosed above, it is one object of the present invention to resolve the mentioned drawbacks of the known technique within the scope of a simple, rational solution and with a favourable costs-and-benefits ratio. Such and other objects are achieved by the features of the invention indicated in the independent claims. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

[0012] In particular, one embodiment of the present invention makes available a package comprising:

- an article having two opposite faces and a plurality of flanks, of which at least a front flank, a rear flank and two lateral flanks, for example a ceramic slab or a stack of superposed ceramic slabs,
- at least two protective bands, of which a first protective band for covering the front flank and partly the two lateral flanks and the two opposite faces of the article, and a second protective band for completely covering the rear flank and partly the two lateral flanks and the two opposite faces of the article, and
- an external cladding of extensible film, for covering the opposite faces and the lateral flanks of the article and the portions of the two protective bands covering them.

[0013] Due to this solution, the external cladding of extensible film effectively protects the protective bands from moisture, thus reducing the risk that the same may get wet and therefore decreasing the effects of the associated drawbacks. The external cladding of extensible film also has the effect of effectively blocking and holding the protective bands in contact with the article, thus making superfluous the use of glues, strips or other fixing systems. Another effect of the external cladding of extensible film is the one of at least partly increasing the level of mechanical protection for the article and for the protective bands, in particular at the most critical points such as corners.

[0014] According to one aspect of the package, the two protective bands may be conformed so as to cover the opposite faces of the article along a perimeter strip, thus leaving uncovered a central portion.

[0015] Thereby, the packaged article is at least partly visible from the outside. According to another aspect of the package, each protective band comprises at least a layer of a closed-cell expanded polymer, for example of closed-cell expanded polyethylene.

[0016] This layer of closed-cell expanded polymer has the effect of creating a kind of elastic mattress capable of absorbing at least partly the knocks which the package may be subjected to during the storing and transport so as to effectively protect the article therein contained. The layer of closed-cell expanded polymer also gives each protective band great flexibility which allows it to be folded over the faces and over the flanks of the article, without the need for scoring lines. Thereby, the protective bands are capable of providing the article with increased mechanical protection with respect to conventional cartonboard cutting dies, especially at the corners.

[0017] Another aspect of the package provides for each protective band to comprise also a polymeric film fixed on the layer of closed-cell expanded polymer, for example a high-density polyethylene extensible film.

[0018] This layer of extensible polymeric film has the effect of mechanically supporting the layer of closed-cell expanded polymer, thus reducing the risk that the latter may be torn or ripped. The extensible polymeric film is even more inkjet printable, thus allowing brands or business logos, text or any other design marks to be printed on the protective bands. The fact that both layers are made of polymeric material also has the effect of making the protective bands easier to dispose of and/or recycle because there is no need to separate the two layers from each other.

[0019] According to another aspect of the package, each protective band may be orientated in such a way that the layer of closed-cell expanded polymer is in contact with the article.

[0020] This solution maximizes the positive effects both of the expanded polymer layer and of the extensible polymeric film, which will be facing towards the outside of the package.

[0021] Another aspect of the package provides for the two protective bands not to have points of reciprocal superposing.

[0022] Practically, the areas of the article which are covered by the first protective band are areas left uncovered by the second band and vice versa, thus minimizing the consumption of material and avoiding the package from having enlargements along the lateral flanks.

[0023] According to a different aspect of the package, the external cladding may comprise two distinct envelopings of extensible film, of which a first enveloping for winding the opposite faces and the lateral flanks of the article at the portions covered by the first protective band, and a second enveloping for winding the opposite faces and the lateral flanks of the article at the portions covered by the second protective band.

[0024] Thereby, each of the two envelopings allows blocking the relative protective band on the article independently from the other, thus allowing the two protective bands to be applied to the article to be packaged at various times and without the need to fix them to each other or directly to the article.

[0025] One aspect of the package provides for the extensible film of the external cladding to be transparent.

[0026] Due to this solution, both the packaged article and any trademarks, logos or text on the protective bands remain advantageously visible from the outside. According to another aspect of the package, the extensible film of the external cladding may be polymeric, e.g. of polyethylene.

[0027] This type of material allows obtaining an external cladding having good mechanical qualities and which may be disposed of and/or recycled together with the protective bands.

[0028] Another embodiment of the present invention makes available a corresponding method for packaging an article, in which said article has two opposite faces and a plurality of flanks, of which at least a front flank, a rear flank and two lateral flanks, for example a ceramic slab or a stack of superposed ceramic slabs.

[0029] Such method comprises the steps of:

- covering the front flank and partly the two lateral flanks and the two opposite faces of the article with a first protective band,
- covering the rear flank and partly the two lateral flanks and the two opposite faces of the article with a second protective band, and
- covering the opposite faces and the lateral flanks of the article and the portions of the two protective bands covering them with an external cladding of extensible film.

[0030] This embodiment of the invention allows effectively making a package having the merits and advantages mentioned above. To this end, all the features highlighted above dealing with the package as such, including for example the material of the protective bands, the material of the extensible film and the arrangement thereof, are intended as being valid also in relation to the method for making the package.

[0031] According to one aspect of the method, the covering step may include winding the opposite faces and the lateral flanks of the article at the portions covered by the first protective band with a first enveloping of extensible film, and winding the opposite faces and the lateral flanks of the article at the portions covered by the second protective band with a second enveloping of extensible film, distinct from the first one.

[0032] As already mentioned, this solution has the effect that each of the two envelopings allows blocking the relative protective band on the article independently from the other, thus allowing the two protective bands to be applied to the article to be packaged at various times and without the need to fix them to each other or directly to the article.

[0033] In particular, one aspect of the method provides the step of winding the opposite faces and the lateral flanks of the article at the portions covered by the first protective band, with a first enveloping of extensible film, to be carried out before the step of covering the rear flank and partly the two lateral flanks and the two opposite faces of the article with the second protective band. Thereby, the semi-package may be moved between the two winding steps in a very simple manner, without the danger for the first protective band to be separated.

[0034] According to a different aspect of the method, the step of covering the front flank and partly the two lateral flanks and the two opposite faces of the article with the first protective band, may comprise the activities of:

- positioning the article in order to turn the front flank towards an inlet of a folding matrix,
- interposing the first protective band in a flat configuration between the front flank of the article and the folding matrix,
- advancing the article through the folding matrix so as to obtain a preliminary intercepting of the first protective band by the front flank and a subsequent insertion of the article together with the first protective band internally of the folding matrix.

[0035] Thereby, the application of the first protective band may occur in an extremely simple and quick manner, without the need to use complicated systems that fold the protective band but simply through a step of advancing the article and the first protective band internally of the matrix.

[0036] Another aspect of the method provides for the external cladding of extensible film to be obtained by means of the activities of:

- positioning a free end of a strip of extensible film in proximity of an outlet of the folding matrix and,
- while the article exits from the folding matrix, rotating the strip of extensible film about a rotation axis that is parallel to the advancement direction of the article, by winding it about the opposite faces and the lateral flanks of the article at the portions covered by the first protective band.

[0037] This aspect provides a simple and effective solution for making the first enveloping of extensible film on the first protective band by simply advancing the semi-package without the need for it to rotate on itself.

[0038] The last two aspects of the packaging method may naturally be applied similarly also to the second protective band and to the second enveloping of extensible film.

[0039] In particular, one aspect of the invention provides that the step of covering the rear flank and partly the two lateral flanks and the two opposite faces of the article with the second protective band, may comprise the activities of:

- positioning the article in order to turn the rear flank towards an inlet of a folding matrix,
- interposing the second protective band in a flat configuration between the rear flank of the article and the folding matrix,
- advancing the article through the folding matrix so as to obtain a preliminary intercepting of the second protective band by the rear flank and a subsequent insertion of the article together with the second protective band internally of the folding matrix.

[0040] Then, the external cladding of extensible film may be obtained by means of the activities of:

- positioning a free end of a strip of extensible film in proximity of an outlet of the folding matrix, and
- while the article exits from the folding matrix, rotating the strip of extensible film about a rotation axis that is parallel to the advancement direction of the article by winding it about the opposite faces and the lateral flanks of the article at the portions covered by the second protective band.

[0041] According to a different aspect of the invention, the step of positioning the article to turn the rear flank towards the inlet of the folding matrix provides rotating the article, for example rotating it on itself about an axis orthogonal to the opposite faces.

[0042] This latter contrivance has the advantage of allowing the execution of all the steps of the process "in line" and by means of movement systems which are relatively simple and affordable.

[0043] Another embodiment of the present invention finally makes available a plant for packaging an article having two opposite faces and a plurality of flanks, of which at least a front flank, a rear flank and two lateral flanks, for example a ceramic slab or a stack of superposed ceramic slabs.

[0044] Such plant comprises in operating sequence:

- a first device for covering the front flank and partly the two lateral flanks and the two opposite faces of the article with a first protective band,
- a first device for winding the opposite faces and the lateral flanks of the article at the portions covered by the first protective band with a first enveloping of extensible film,
- a second device for covering the rear flank and partly the two lateral flanks and the two opposite faces of the article with a second protective band, and
- a second device for winding the opposite faces and the lateral flanks of the article at the portions covered by the second protective band with a second enveloping of extensible film.

[0045] This embodiment of the invention provides the

operating tools for effectively making a package having the merits and advantages mentioned above by substantially putting into practice the operating steps of the packaging method. To this end, all the features highlighted above dealing with the package and the packaging method as such, including for example the material of the protective bands, the material of the extensible film and the arrangement thereof, are intended as being valid also in relation to the plant for making the package.

[0046] According to one aspect of the plant, the first covering device may comprise:

- a folding matrix,
- an apparatus for positioning the article with the front flank facing towards an inlet of the folding matrix,
- an apparatus for interposing the first protective band in a flat configuration between the front flank of the article and the folding matrix,
- an apparatus for advancing the article through the folding matrix after interposing the first protective band to obtain a preliminary intercepting of the first protective band by the front flank and a subsequent insertion of the article together with the first protective band internally of the folding matrix.

[0047] As anticipated above, this solution ensures that the application of the first protective band may occur in an extremely simple and quick manner, simply through a step of advancing the article and the first protective band internally of the matrix.

[0048] Another aspect of the plant then provides for the first winding device to comprise:

- an apparatus for positioning a free end of a strip of extensible film in proximity of an outlet of the folding matrix, and
- an apparatus for rotating the strip of extensible film about a rotation axis parallel to the advancement direction of the article while the article exits from the folding matrix.

[0049] This aspect provides a simple and effective solution for making the first enveloping of extensible film on the first protective band by simply advancing the semi-package without the need for it to rotate on itself.

[0050] In particular, one aspect of the plant provides for the apparatus for rotating the strip to comprise:

- a support element for a reel on which the strip of extensible film is wound,
- an actuation system for rotating said support element about the rotation axis.

[0051] Thereby, the strip of extensible film is unwound by the reel as the reel rotates about the article.

[0052] The last aspects of the packaging plant may naturally be applied similarly also to the second protective band and to the second enveloping of extensible film.

In particular, one aspect of the plant provides for the second covering device to comprise:

- a folding matrix,
- an apparatus for positioning the article with the rear flank facing towards an inlet of the folding matrix,
- an apparatus for interposing the second protective band in a flat configuration between the rear flank of the article and the folding matrix,
- an apparatus for advancing the article through the folding matrix after interposing the second protective band to obtain a preliminary intercepting of the second protective band by the rear flank and a subsequent insertion of the article together with the second protective band internally of the folding matrix.

[0053] Then, the second winding device may comprise:

- an apparatus for positioning a free end of a strip of extensible film in proximity of an outlet of the folding matrix, and
- an apparatus for rotating the strip of extensible film about a rotation axis parallel to the advancement direction of the article while the article exits from the folding matrix.

[0054] The apparatus for rotating the strip may comprise:

- a support element for a reel on which the strip of extensible film is wound,
- an actuation system for rotating said support element about the rotation axis.

[0055] According to another aspect of the plant, the apparatus for positioning the article with the rear flank facing towards the inlet of the folding matrix may also comprise a device for rotating the article, for example for rotating it on itself about an axis orthogonal to the opposite faces.

[0056] Thereby, the packaging plant may develop in line and by means of relatively simple and affordable movement systems.

Brief description of the drawings

[0057] Further features and advantages of the invention will be more apparent after reading the following description provided by way of a non-limiting example, with the aid of the accompanying drawings.

Figure 1 is a perspective view of a stack of ceramic slabs forming an article to be packaged according to one embodiment of the present invention.

Figure 2 is a perspective view of the package obtained according to the teachings of the present invention.

Figure 3 is the flat development of the first and/or second protective band used for packaging the article in figure 1.

Figure 4 is a sequence of images describing the packaging method of the article in figure 1.

Figure 5 is a diagrammatic side view of a plant for performing the packaging in figure 4.

Figure 6 is a perspective and detailed view of a detail of the plant in figure 5.

Figures 7 to 14 depict a top view of a portion of the plant in figure 5, shown during just as many operating steps during the operation thereof.

Detailed description

[0058] With the aid of the aforesaid figures, a system is described for packaging an article 100 having generally the shape of a parallelepiped (see fig. 1), for example with six equal rectangular faces opposed to each other two-by-two, of which two opposite faces, respectively top 105 and bottom 110, and four peripheral flanks, of which one front flank 115, one rear flank 120 and two lateral flanks 125 and 130.

[0059] The article 100 may be formed by a single ceramic slab or plate, in which case it has a flattened shape with the peripheral flanks having a much narrower size (the thickness) with respect to the top and bottom faces 105 and 110.

[0060] In the specific example, the article 100 consists of a stack of ceramic slabs or plates, for example of two or more ceramic slabs or plates, which are stacked on each other in an orderly manner so as to be perfectly superposed, and they are therefore capable of forming globally a parallelepiped article as outlined above.

[0061] As shown in figure 2, the article 100 is packaged inside a peripheral frame 200, which is adapted to border the peripheral flanks 115, 120, 125 and 130, thus covering partly also the opposite faces 105 and 110 but leaving uncovered a central portion which allows seeing the article 100 from the outside.

[0062] This peripheral frame 200 comprises two protective bands (see fig. 4), of which a first protective band 205 for bordering the front flank 115 and partly the two lateral flanks 125 and 130, and a second protective band 210 for bordering the rear flank 120 and partly the two lateral flanks 125 and 130, preferably without any point of superposing with the first protective band 205.

[0063] To absolve this function, each protective band 205 and 210 may have a substantially rectangular shape, as shown in figure 3, with length L greater than the length of the front 115 and rear 120 flanks, for example equal to or slightly smaller than the sum of the length of one of the front 115 or rear 120 flanks and the length of one of the lateral flanks 125 or 130, and a height H greater than the height of the peripheral flanks 115, 120, 125 and 130. Thereby, the portion of each protective band 205 and 210 that exceeds the height of the object 100 is folded over the top 105 and bottom 110 faces, thus completing the aforesaid frame 200.

[0064] In the end, the first protective band 205 covers completely the front flank 115, the second protective band 210 covers completely the rear flank 120, while the two lateral flanks 125 and 130 and the two opposite faces 105 and 110 are covered partly by the first and partly by the second protective band 205 and 210.

[0065] In order to be effectively folded over the two opposite faces 105 and 110 of the article 100, each protective band 205 and 210 may have two pairs of bevels 215, where each pair comprises two bevels 215 obtained on the opposite sides of the protective band.

[0066] Each bevel 215 is substantially made as a triangular notch, with the base arranged on the side on which it is obtained and the vertex facing towards the opposite side and having an opening of about 45°.

[0067] The linear distance between the bevels 215 made on each side is about equal to the length of the front 115 and rear 120 flanks of the article 100, while the distance between the vertexes of each pair of bevels 215 mutually opposite to each other on the two sides is about equal to the overall thickness of the article 100.

[0068] Thereby, the ideal rectangle having as a vertex the vertexes of the four bevels 215 (indicated with a dotted line in figure 3) is the portion of each protective band 205 and 210 which respectively covers the front flank 115 or the rear flank 120 of the article 100, while the portions outside this ideal rectangle are the ones which are folded over the lateral flanks 125 and 130 and over the top 105 and bottom 110 faces.

[0069] Due to the bevels 215 placed at the corners, the portions which are folded over the top 105 and bottom 110 faces are also brought to match with each other, without interfering and without creating superposings of material.

[0070] In greater detail, each protective band 205 and 210 may consist of a material with comprises at least a layer of a closed-cell expanded polymer, for example closed-cell expanded polyethylene, and possibly also a layer of polymeric film, for example a high-density polyethylene extensible film, which is firmly fixed on the layer of closed-cell expanded polymer thus covering it completely. The layer of closed-cell expanded polymer is placed in direct contact with the article 100, thus defining a kind of soft and elastic mattress capable of absorbing at least partly the knocks that article 100 may be subjected to, while the extensible polymeric film remains facing outwards to mechanically carry the layer of closed-cell expanded polymer, thus reducing the risk that it may be torn or ripped.

[0071] The outer layer of extensible film may also be inkjet printed beforehand so as to replicate thereon trademarks or business logos, text or any other design marks.

[0072] Returning to figure 2, the package comprises finally an external cladding 220 of extensible film, which is for covering the opposite faces 105 and 110 and the lateral flanks 125 and 130 of the article 100, thus covering also the portions of the protective bands 205 and 210

covering them.

[0073] The extensible film of the external cladding 220 may be transparent and may also be polymeric in nature, e.g. made of polyethylene. The extensible film may be applied on the article 100 in two different moments (see fig. 4) so that the external cladding 220 is made from two distinct envelopings of extensible film, of which a first enveloping 225 for winding the faces of the article 100 at the portions covered by the first protective band 205, and a second enveloping 230 for winding the faces of the article 100 at the portions covered by the second protective band 210.

[0074] Thereby (see fig. 2), globally a package is obtained which protective bands 205 and 210 effectively protect the article 100 (for example, the stack of ceramic slabs) from knocks which they may be subjected to during the storing and transport, and where the external cladding 220 of extensible film effectively protects the protective bands 205 and 210 from moisture, thus reducing the risk that the same may get wet and therefore may rip, break or be otherwise damaged.

[0075] In order to make the above-described package, a plant 300 may be used of the type of the one schematized in figure 5, which provides in general advancing the article 100 through a series of devices placed in operating sequence with one another, namely adapted to act one after the other on the article 100 which is advanced.

[0076] These operating devices comprise firstly a device 305 for applying the first protective band 205 on the front flank 115 and partly the two lateral flanks 125 and 130 and on the two opposite faces 105 and 110 of the article 100.

[0077] This device 305 comprises a folding matrix, indicated globally with 310, which comprises an element or assembly of elements which are globally adapted to define a kind of frame which delimits a passage 315, which is open at both the opposite ends, through which the article 100 passes.

[0078] This passage 315 extends longitudinally along a preset central axis X of the folding matrix 310, from an inlet 320 towards an outlet 325.

[0079] The cross section of this passage 315, namely the section in a plane orthogonal to the central axis X, has substantially the same rectangular shape as the front 115 and rear 120 flanks of the article 100 but slightly larger sizes, for example larger by a quantity equal to double the thickness of the protective bands.

[0080] It is worth immediately noting that the axial length of this passage 315 may be rather small, for example smaller than the length of the lateral flanks 125 and 130 of the article 100, and that its sides are not to be necessarily defined by continuous and closed elements, it being sufficient for them to be defined by sides which globally lie on mutually orthogonal planes adapted to define the perimeter of the aforesaid passage 315.

[0081] As shown in figure 6, the passage 315 may be for example defined by two lateral sides 330 and 335 lying vertically and mutually opposite, by a pair of top sides 340 lying horizontally and mutually coplanar, and by a pair of bottom sides 345, again lying horizontally, mutually coplanar but opposite to the top sides 340.

[0082] Thereby, the sides 330, 335, 340 and 345 delimit globally the sides of a rectangular corridor with a central axis X developing horizontally that defines the aforesaid passage 315.

[0083] The sizes of this passage 315 may be adjusted according to the format of the article 100 to be packaged, namely the specific transversal sizes of the latter. To this end, the lateral sides 330 and 335 may be associated with first movement means that allow them to be mutually moved away from or close to each other in horizontal direction to vary the width of the passage 315, while the top sides 340 may be associated with second movement means that allow them to be moved close to the bottom sides 345 in vertical direction to vary the height of the passage 315. The first and the second movement means are not described in greater detail because they are in themselves conventional. Instead, it is worth noting that the top sides 340 and the bottom sides 345 could be provided with a mutual approaching/distancing movement in horizontal direction, similar to the one of the lateral sides 330 and 335, so as to adapt the reciprocal distance thereof to the actual width of the passage 315 and therefore of the article 100 to be packaged.

[0084] In other embodiments, the top sides 340 and the bottom sides 345 could also be made from a single side, respectively top and bottom.

[0085] In any case, both the lateral sides 330 and 335 and the top and bottom sides 340 and 345 may be provided with a curved portion placed at the inlet 320 of the passage 315 to create an invitation that facilitates the inlet of the article 100.

[0086] It is worth finally noting that although in the example illustrated, the sides 330, 335, 340 and 345 are all placed substantially in the same axial position, in other embodiments, the sides could be at least slightly offset with one another along the direction of the central axis X.

[0087] Returning to figure 5, the device 305 further comprises an apparatus 350 adapted to position the article 100 to be packaged aligned in front of the folding matrix 310, with the front flank 115 facing towards the inlet 320 of the passage 315.

[0088] This apparatus 350 may comprise for example, a linear conveyor 355 defining a sliding plane, which is substantially coplanar to the bottom sides 345 of the folding matrix 310, which is adapted to receive in abutment the article 100 already conveniently oriented and to advance it in the direction of the central axis X towards the inlet 320 of the passage 315.

[0089] In particular, this linear conveyor 355 could be defined by two parallel and mutually coplanar sliding belts 360 (see fig. 6) which are separated by a gap and are adapted to slide simultaneously and at the same speed in front of the folding matrix 310.

[0090] As shown in figures 7 to 14, the device 305 further comprises an apparatus 365 for interposing the first

protective band 205 in flat configuration, namely still developed flat, between the front flank 115 of the article 100 which is on the plane of the linear conveyor 355 and the inlet 320 of the folding matrix 310. In particular, the first protective band 205, which as anticipated has generally a rectangular shape, is oriented vertically and is placed in front of the inlet 320 of the folding matrix 310 so as to occlude the passage 315 with respect to the advancement direction X of the article 100 (see for example fig. 13).

[0091] To this end, the apparatus 365 may comprise support means 370 for at least one reel of a strip 375 of the material which is intended to make the protective band 205, which support means may be positioned beside the folding matrix 310.

[0092] The reel may be already vertically oriented on these support means 370 so that the strip 375 which unwinds from it is lying vertically and substantially at the same height as the folding matrix 310.

[0093] The apparatus 365 further comprises a first and a second gripper, respectively 380 and 385, each of which is adapted to grasp and selectively release the strip 375 which unwinds from the reel.

[0094] These grippers 380 and 385 are associated with suitable movement means (not shown) which allow them to slide independently from each other along a horizontal direction Y which is orthogonal to the central axis X of the folding matrix 310.

[0095] The two grippers 380 and 385 are mutually aligned with each other along this sliding direction Y.

[0096] In particular, each gripper 380 and 385 is adapted to slide in both directions from a respective retracted position (shown in figure 7) towards a respective advanced position (shown in figure 14).

[0097] In the retracted position, the grippers 380 and 385 are close to each other and both placed on the same side as the folding matrix 310, for example with the first gripper 380 located further from the folding matrix 310 with respect to the second gripper 385.

[0098] Passing to the advanced position, the first gripper 380 moves near to the folding matrix 310, thus remaining always localized on the same side in which it was previously, while the second gripper 385 is on the opposite side of the folding matrix 310.

[0099] In order to tighten and release the strip 375 which unwinds from the reel, each gripper 380 and 385 comprises generally a pair of jaws adapted to mutually move in an approaching and distancing manner in direction orthogonal to the sliding direction Y.

[0100] The apparatus 365 further comprises a clamp 390 which is positioned beside the folding matrix 310, on the same side in which also the grippers 380 and 385 are in resting position.

[0101] The clamp 390 is aligned with the grippers 380 and 385 along the sliding direction Y and is located further away from the folding matrix 310 with respect to the grippers themselves.

[0102] Also the clamp 390 comprises generally a pair of jaws adapted to mutually move in an approaching and distancing manner in direction orthogonal to the sliding direction Y, respectively to tighten and release the strip 375 which unwinds from the reel.

[0103] Unlike the grippers 380 and 385, the clamp 390 may not however slide along the direction Y since it is provided for it to remain always still in the same position.

[0104] Downstream of the clamp 390 (with respect to the sliding direction Y), the apparatus 365 may comprise cutting means 395 which are adapted to cut the strip 375 in transversal direction so as to separate one portion thereof which defines the first protective band 205.

[0105] The cutting means 395 are not further described because they are in themselves conventional.

[0106] Downstream of these cutting means 395 (always with respect to the sliding direction Y), the apparatus 365 may finally comprise a cutting machine 400 adapted to make the pairs of bevels 215 along the opposite edges of the first protective band 205.

[0107] The cutting machine 400 is positioned beside the folding matrix 310, on the same side on which there is also the clamp 390, with respect to which it is aligned along the sliding direction Y.

[0108] The cutting machine 400 operates in fixed position and comprises a cutting die and a counter-cutting die which are mutually movable in direction orthogonal to the sliding direction Y.

[0109] As shown in figure 7, the first and the second gripper 380 and 385 in retracted position are comprised between the clamp 390 and the cutting machine 400, while in the advanced position (see figure 14), they are both positioned on the side opposite to the cutting machine 400.

[0110] To allow this crossing, the mutual distancing stroke between the cutting die and the counter-cutting die of the cutting machine 400 is to be sufficiently large to allow the passage of the two grippers 380 and 385.

[0111] In use, the strip 375 which unwinds from the reel is deflected by one or more return rollers so that the end stretch thereof is aligned to the sliding direction Y.

[0112] The end stretch of the strip 375 is initially narrow when clamped by the clamp 390 so that the end edge thereof projects towards the folding matrix 310 and passes through the open jaws of the two grippers 380 and 385 which are in the retracted position (see fig. 8).

[0113] At this point, the two grippers 380 and 385 tighten on the strip 375, the clamp 390 opens and the two grippers 380 and 385 are then advanced along the sliding direction Y towards the folding matrix 310, dragging with it the strip 375 which unwinds progressively from the reel (see fig. 8).

[0114] When both the grippers 380 and 385 are interposed between the cutting means 395 and the cutting die 400, the first gripper 380 stops and opens while the second gripper 385 continues advancing, passing through the cutting die and the counter-cutting die of the cutting machine 400 (see fig. 9).

[0115] After a preset advancing, the second gripper

385 stops and the cutting machine 400 begins operation, which makes the first pair of bevels 215 (see fig. 10) along the opposite edges of the strip 375.

[0116] After a further preset advancing, the second gripper 385 stops and the cutting machine 400 begins operating again, which makes the second pair of bevels 215 (see fig. 11) along the opposite edges of the strip 375.

[0117] Then, the clamp 390 and the first gripper 380 tighten on the strip 375, after which operation begins by the cutting means 395, which separate the portion of strip in which the bevels 215 were made, thus obtaining the first protective band 205 (see fig. 12).

[0118] At this point, the first protective band 205 is carried by the two grippers 380 and 385, which are therefore advanced simultaneously up to reaching the respective advanced positions, bringing thereby the protective band 205 in position aligned in front of the inlet 320 of the folding matrix 310 (see fig. 13). When the first protective band 205 is inserted into the folding matrix (as is detailed later), the grippers 380 and 385 open (see fig. 14) and then return to the respective retracted positions so as to repeat the previous operations in order to prepare a new protective band.

[0119] Naturally, the operating positions (retracted and advanced) of the two grippers 380 and 385, as well as the positions of the clamp 390, of the cutting means 395 and of the cutting machine 400, may be conveniently adjusted according to the length of the first protective band 205, i.e. according to the format of the article 100 to be packaged.

[0120] As shown in figures 13 and 14, the device 305 further comprises an apparatus 405 for advancing the article 100 through the folding matrix 310 after the first protective band 205 was interposed between the front flank 115 of the article 100 and the inlet 320 of the folding matrix 310.

[0121] In the example illustrated, this apparatus 405 may comprise e.g. a pushing member 410, which is associated with suitable movement means (not shown) which allow it to move in the direction of the central axis X of the folding matrix 310 from a retracted position (shown in figure 13) to an advanced position (shown in figure 14).

[0122] The pushing member 410 in retracted position is positioned above the linear conveyor 355 of the positioning apparatus 350 (see figures 5 and 13), upstream of the folding matrix 310 with respect to the advancement direction X, while in the advanced position, the pushing member 410 is positioned downstream of the folding matrix 310 (see fig. 14).

[0123] To perform this movement, the pushing member 410 may be configured so as to slide along the gap between the two sliding belts 360 which define the linear conveyor 355 and so as to merge between the two bottom sides 345 of the folding matrix 310 (see also fig. 6).

[0124] The pushing member 410 in retracted position is located behind the article 100 to be packaged (with respect to the advancement direction X) so that by moving towards the advanced position, the pushing member 410 pushes the article 100 to slide on the linear conveyor 355 and then to merge progressively in the folding matrix 310.

[0125] Thereby, the front flank 115 of the article 100 comes first into contact with the central portion of the protective band 205 and then pushes it to be inserted therewith internally of the passage 315 of the folding matrix 310.

[0126] Due to this joint insertion, the sides 330, 335, 340 and 345 of the folding matrix 310 ensure that in addition to covering the front flank 115, the first protective band 205 folds also over the lateral flanks 125 and 130 and over the opposite faces 105 and 110, as was already described above.

[0127] Once this step is complete, the actuating means bring the pushing member 410 back to the retracted position, for example by passing it below the linear conveyor 355, which in the meantime may have brought a new article to be packaged.

[0128] Returning to figure 5, downstream of the folding matrix 310 (with respect to the advancement direction X of the article 100), the plant 300 comprises a winding device 415 for making the first enveloping 225 of extensible film, namely the one which covers the opposite faces 105 and 110 and the peripheral flanks 115, 120, 125 and 130 of the article 100 at the portions covered by the first protective band 205.

[0129] This winding device 415 comprises essentially a support element 420 adapted to carry a reel on which a strip of extensible film 425 is wound and an actuation system (not shown) which is adapted to rotate the support element 420 (and therefore the reel) about the central axis X of the folding matrix 310.

[0130] In particular, the support element 420 is adapted to carry the reel so that the axis of the latter is parallel to but spaced apart from the central axis X of the folding matrix 310, so that the reel is substantially adapted to perform a revolutionary motion which does not interfere with the advancing of the article 100.

[0131] The winding device 415 further comprises an apparatus 430, comprising e.g. a gripper device or similar, which is positioned as close to the folding matrix 310 as possible with respect to the reel and is adapted to carry and hold the free end of the strip of extensible film 425 close to the outlet 325 of the folding matrix 310.

[0132] This apparatus 430 may comprise also cutting means adapted to transversally cut the strip of extensible film 425.

[0133] In use, while the article 100 exits from the folding matrix 310 pushed by the pushing member 410, the actuating means engage the support element 420 of the reel to rotate about the central axis X.

[0134] In a first step of this revolutionary movement, the apparatus 430 holds the free end of the strip of extensible film 425, which starts therefore to wind about the article 100.

[0135] When the strip of extensible film 425 is adhering

to the article 100, for example after the reel has completed at least one complete
, the apparatus 430 releases the free end of the strip.

[0136] As the article 100 advances and exits from the folding matrix 310, the reel continues rotating about it, thus performing a plurality of windings up to completing the first enveloping 225.

[0137] When the first enveloping 225 is complete, the reel is stopped and the apparatus 430 grasps the strip of extensible film 425.

[0138] At this point, the cutting means on the apparatus 430 cut the strip of extensible film 425, thus separating it from the first enveloping 225 and therefore freeing the article 100.

[0139] Downstream of the winding device 415 (with respect to the advancement direction X), the plant 300 comprises a device 435 for applying the second protective band 210 on the rear flank 120 and partially on the two lateral flanks 125 and 130 and on the two opposite faces 105 and 110 of the article 100. This device 435 comprises a folding matrix, indicated globally with 440, which delimits a passage 445 that extends longitudinally along a preset central axis X from an inlet 450 towards an outlet 455.

[0140] The description of the folding matrix 440 is entirely similar to the description of the first folding matrix 310, to which reference is made for further details. The device 435 further comprises an apparatus 460 adapted to position the article 100 to be packaged aligned in front of the folding matrix 440, with the rear flank 120 facing towards the inlet 450 of the passage 445.

[0141] This apparatus 460 may comprise for example, a first linear conveyor 465 defining a sliding plane which is adapted to receive in abutment the article 100 exiting from the first folding matrix 310, downstream of the winding device 415. This first linear conveyor 465 may advance the article 100 always in direction X up to transferring it on a second linear conveyor 470, which may be assembled above a rotating platform.

[0142] Due to the rotation of the rotating platform, the article 100 is rotated on itself about a vertical axis Z, for example by 180°, so as to turn the rear flank 120 of the article 100 towards the second folding matrix 440.

[0143] Downstream of the second linear conveyor 470, the positioning apparatus 460 may comprise a third linear conveyor 475, which is adapted to move the article 100 close to the inlet 450 of the folding matrix 440.

[0144] The description of this third linear conveyor 475 is entirely similar to the description of the linear conveyor 355 placed at the inlet of the first folding matrix 310.

[0145] The device 435 further comprises an apparatus 480 for interposing the second protective band 210 in flat configuration, namely still developed flat, between the rear flank 120 of the article 100 which is on the third linear conveyor 475 and the inlet 450 of the folding matrix 440.

[0146] The description of this apparatus 480 is entirely similar to the description of the apparatus 365 associated with the first folding matrix 310, to which reference is made for further details.

[0147] The device 435 comprises also an apparatus 485 for then advancing the article 100 through the folding matrix 440, for example by means of a pushing member 490.

[0148] Also the description of this pushing member 490 and of the relative actuating means is entirely similar to the description of the pushing member 410, to which reference is made for further details.

[0149] Finally, the plant 300 comprises a second winding device 495 for making the second enveloping 230 of extensible film, namely the one which covers the opposite faces 105 and 110 and the peripheral flanks 115, 120, 125 and 130 of the article 100 at the portions covered by the second protective band 210. Thereby, the second enveloping 230 is joined to the first enveloping 225, thus completing the external cladding 220 and therefore the packaging of the article 100 which may then be palletized.

[0150] The second winding device 495 comprises generally a support element 500 for a reel of a strip of extensible film 505, an apparatus 510 for positioning the free end of said strip 505 close to the outlet 455 of the folding matrix 440, and means (not shown) for rotating the support element 500 about the axis X as the article 100 exits.

[0151] The description of this second winding device 495 is entirely similar to the description of the first winding device 415, to which reference is made for further details.

[0152] Obviously, an expert in the field may make several technical-applicative modifications to all that above, without departing from the scope of the invention as hereinbelow claimed.

Claims

1. A package comprising:

   - an article (100) having two opposite faces (105, 110) and a plurality of flanks, of which at least a front flank (115), a rear flank (120) and two lateral flanks (125, 130),
   - at least two protective bands, of which a first protective band (205) for covering the front flank (115) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100), and a second protective band (210) for completely covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100),
   - an external cladding (220) made of an extensible film for covering the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) and the portions of the two protective bands (205, 210) covering them.

2. The package of claim 1, wherein the two protective bands (205, 210) are conformed so as to cover the opposite faces (105, 110) of the article (100) along

a perimeter strip, leaving a central portion thereof uncovered.

3. The package of claim 1 or 2, wherein each protective band (205, 210) comprises at least a layer of a closed-cell expanded polymer.

4. The package of claim 3, wherein each protective band (205, 210) comprises a polymeric film fixed on the layer of closed-cell expanded polymer.

5. The package of claim 3 or 4, wherein each protective band (205, 210) is orientated in such a way that the layer of closed-cell expanded polymer is in contact with the article (100).

6. The package of any one of the preceding claims, wherein the two protective bands (205, 210) have no points of reciprocal superposing.

7. The package of any one of the preceding claims, wherein the external cladding (220) comprises two distinct envelopings of extensible film, of which a first enveloping (225) for winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the first protective band (205), and a second enveloping (230) for winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the second protective band (210).

8. The package of any one of the preceding claims, wherein the extensible film of the external cladding (220) is transparent.

9. The package of any one of the preceding claims, wherein the extensible film of the external cladding (220) is polymeric.

10. The package of any one of the preceding claims, wherein the article (100) comprises a ceramic slab or a stack of ceramic slabs.

11. A method for packaging at least an article (100), wherein said article has two opposite faces (105, 110) and a plurality of flanks, of which at least a front flank (115), a rear flank (120) and two lateral flanks (125, 130), and wherein the method comprises steps of:

- covering the front flank (115) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a first protective band (205),
- covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a second protective band (210),
- covering the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) and the portions of the two protective bands (205, 210) covering them with an external cladding (220) of extensible film.

12. The method of claim 11, wherein the step of covering includes winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the first protective band (205) with a first enveloping (225) of extensible film, and winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the second protective band (210) with a second enveloping (230) of extensible film, distinct from the first one.

13. The method of claim 12, wherein the step of winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the first protective band (205), with a first enveloping (225) of extensible film, is carried out before the step of covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with the second protective band (210).

14. The method of any one of the preceding claims, wherein the step of covering the rear flank (115) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a first protective band (205) comprises the activities of:

- positioning the article (100) in order to turn the front flank (115) towards an inlet (320) of a folding matrix (310),
- interposing the first protective band (205) in a flat configuration between the front flank (115) of the article (100) and the folding matrix (310),
- advancing the article (100) through the folding matrix (310) so as to obtain a preliminary intercepting of the first protective band (205) by the front flank (115) and a subsequent insertion of the article (100) together with the first protective band (205) internally of the folding matrix (310).

15. The method of claim 14, wherein the external cladding (220) of extensible film is obtained by means of:

- positioning a free end of a strip (425) of extensible film in proximity of an outlet (325) of the folding matrix (310) and,
- while the article (100) exits from the folding matrix (310), rotating the strip (425) of extensible film about a rotation axis that is parallel to the advancement direction (X) of the article (100), by winding the strip about the opposite faces (105, 110) and the lateral flanks (125, 130) of

the article (100) at the portions covered by the protective band (205).

16. The method of any one of the preceding claims, wherein the step of covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a second protective band (210) comprises the activities of:

- positioning the article (100) in order to turn the rear flank (120) towards an inlet (450) of a folding matrix (440),
- interposing the second protective band (210) in a flat configuration between the rear flank (120) of the article (100) and the folding matrix (440),
- advancing the article (100) through the folding matrix (440) so as to obtain a preliminary intercepting of the second protective band (210) by the rear flank (120) and a subsequent insertion of the article (100) together with the second protective band (210) internally of the folding matrix (440).

17. The method of claim 16, wherein the external cladding (220) of extensible film is obtained by means of:

- positioning a free end of a strip (505) of extensible film in proximity of an outlet (455) of the folding matrix (440), and
- while the article (100) exits from the folding matrix (440), rotating the strip (505) of extensible film about a rotation axis that is parallel to the advancement direction (X) of the article (100), winding the strip about the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the second protective band (210).

18. The method of claim 16 or 17, wherein the step of positioning the article (100) for turning the rear flank (120) towards the inlet (450) of the folding matrix (440) includes rotating the article.

19. A plant (300) for packing an article (100) having two opposite faces (105, 110) and a plurality of flanks, of which at least a front flank (115), a rear flank (120) and two lateral flanks (125, 130), wherein the plant (300) comprises, in working succession:

- a first device (305) for covering the front flank (115) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a first protective band (205),
- a first device (415) for winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the first protective band (205) with a first enveloping (225) of extensible film,
- a second device (435) for covering the rear flank (120) and partly the two lateral flanks (125, 130) and the two opposite faces (105, 110) of the article (100) with a second protective band (210) and
- a second device (495) for winding the opposite faces (105, 110) and the lateral flanks (125, 130) of the article (100) at the portions covered by the second protective band (210) with a second enveloping (230) of extensible film.

20. The plant (300) according to claim 19, wherein the first device (305) for covering comprises:

- a folding matrix (310),
- an apparatus (350) for positioning the article (100) with the front flank (115) facing towards an inlet (320) of the folding matrix (310),
- an apparatus (365) for interposing the first protective band (205) in a flat configuration between the front flank (115) of the article (100) and the folding matrix (310),
- an apparatus (405) for advancing the article (100) through the folding matrix (310) after interposing the first protective band (205) so as to obtain a preliminary intercepting of the first protective band (205) by the front flank (115) and a subsequent insertion of the article (100) together with the first protective band (205) internally of the folding matrix (310).

21. The plant (300) according to claim 20, wherein the first device (415) for winding comprises:

- a support element (420) for a reel of a strip (425) of extensible film,
- an apparatus (430) for positioning a free end of the strip (425) of extensible film in proximity of an outlet (325) of the folding matrix (310), and
- an apparatus for rotating the support element (420) about a rotation axis parallel to the advancement direction (X) of the article (100), while the article exits from the folding matrix (310).

22. The plant (300) according to any one of claims from 19 to 21, wherein the second device (435) for covering comprises:

- a folding matrix (440),
- an apparatus (460) for positioning the article (100) with the rear flank (120) facing towards an inlet (450) of the folding matrix (440),
- an apparatus (480) for interposing the second protective band (210) in a flat configuration between the rear flank (120) of the article (100)

and the folding matrix (440),
- an apparatus (485) for advancing the article (100) through the folding matrix (440) after interposing the second protective band (210) so as to obtain a preliminary intercepting of the second protective band (210) by the rear flank (120) and a subsequent insertion of the article (100) together with the second protective band (210) internally of the folding matrix (440).

23. The plant (300) according to claim 22, wherein the second device (495) for winding comprises:

- a support element (500) for a reel of a strip (505) of extensible film,
- an apparatus (510) for positioning a free end of the strip (505) of extensible film in proximity of an outlet (455) of the folding matrix (440), and
- an apparatus for rotating the support element (500) about a rotation axis parallel to the advancement direction (X) of the article (100), while the article exits from the folding matrix (440).

24. The plant (300) of claim 22 or 23, wherein the apparatus (460) for positioning the article (100) with the rear flank (120) facing towards the inlet (450) of the folding matrix (440) comprises a device (470) for rotating the article (100).

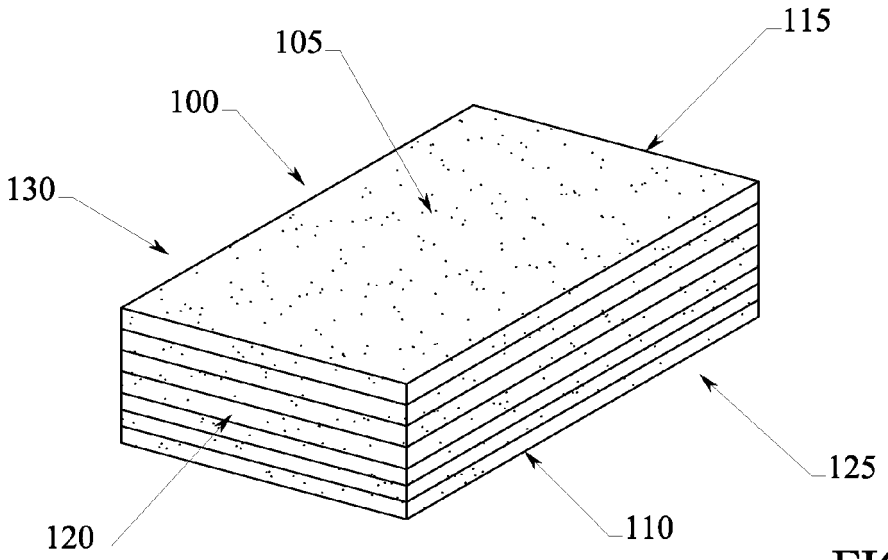

FIG.1

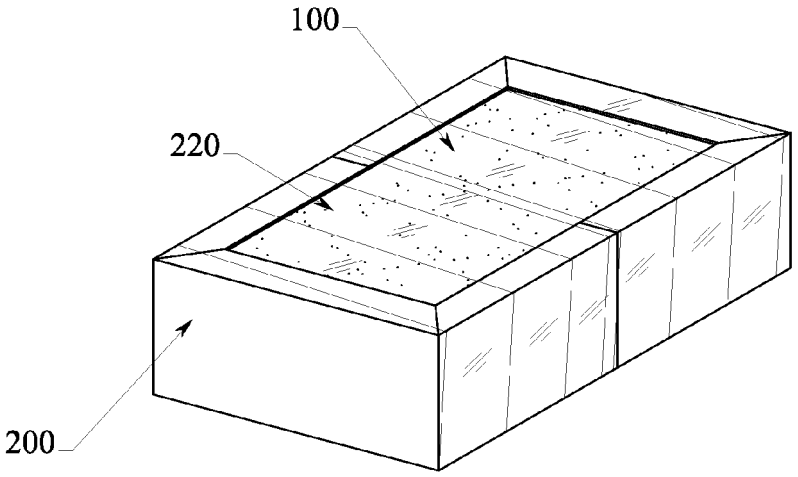

FIG.2

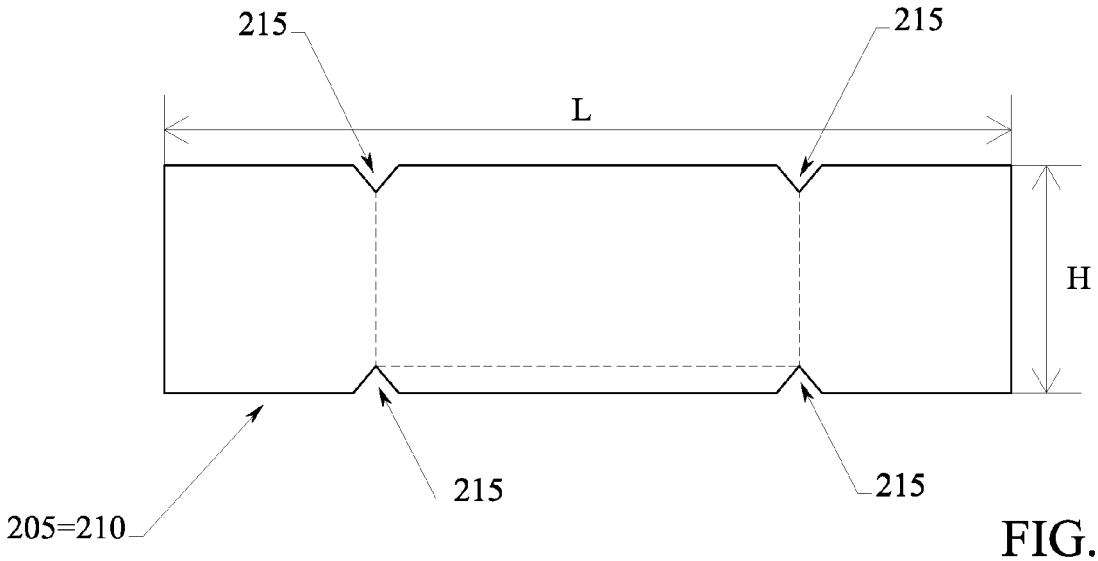

FIG.3

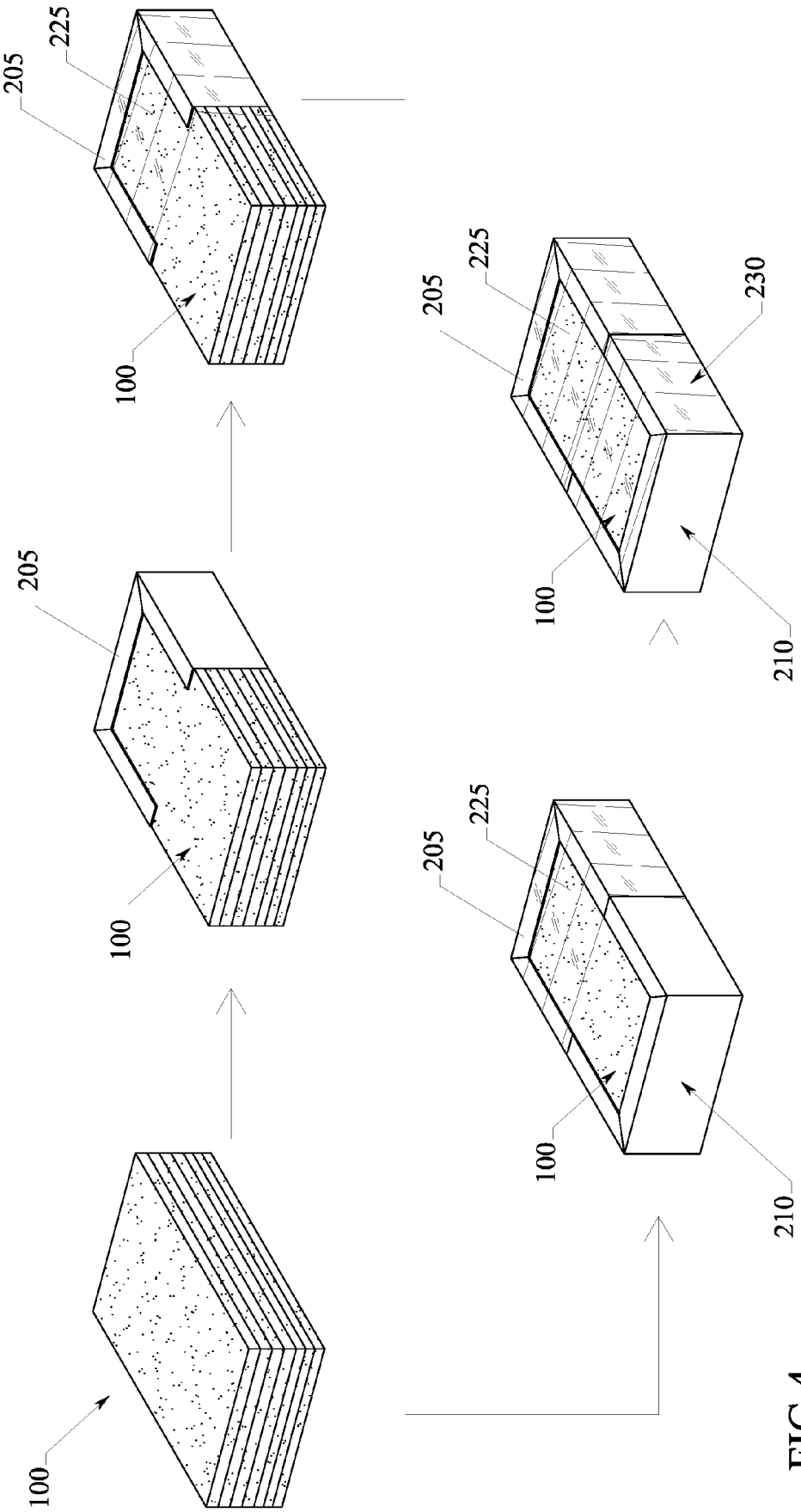
100
205
100
225
205
100
225
230
205
100
210
205
100
225
205
100
210

FIG.4

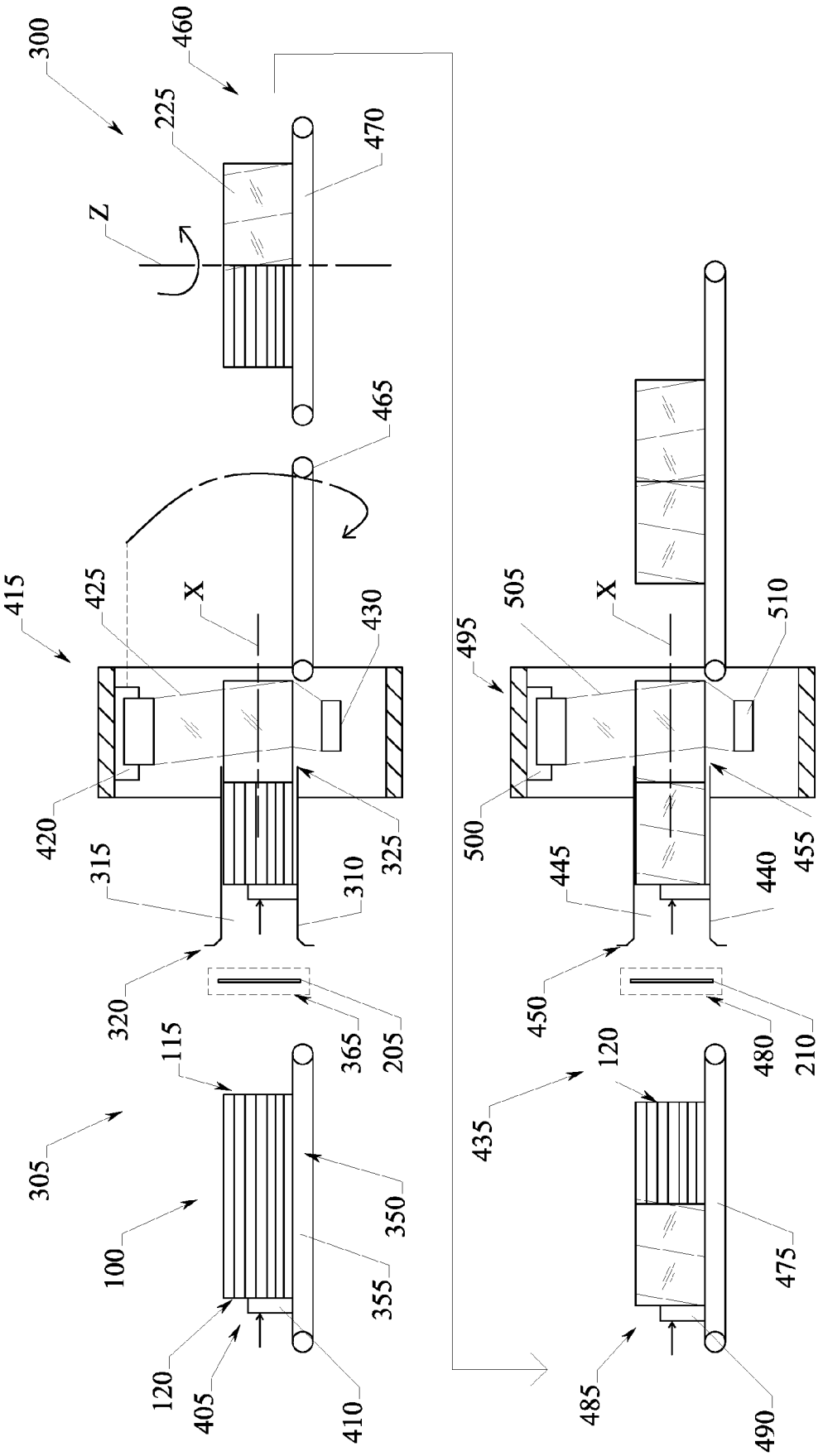
300
460
225
470
Z
465
415
425
X
430
420
315
310
325
320
365
205
115
305
350
100
355
120
405
410
495
505
510
500
445
440
455
450
480
210
435
120
475
485
490

FIG.5

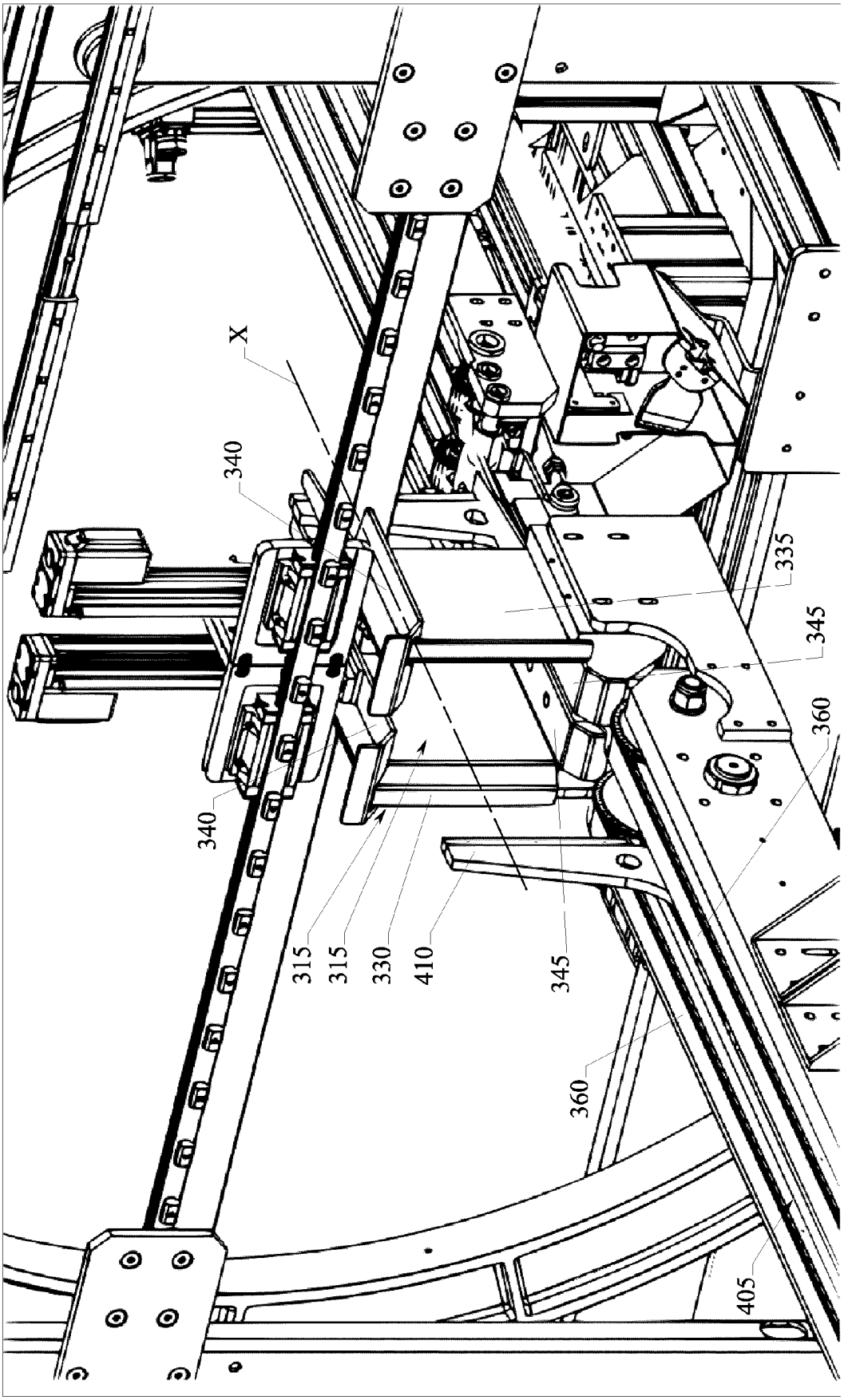

FIG.6

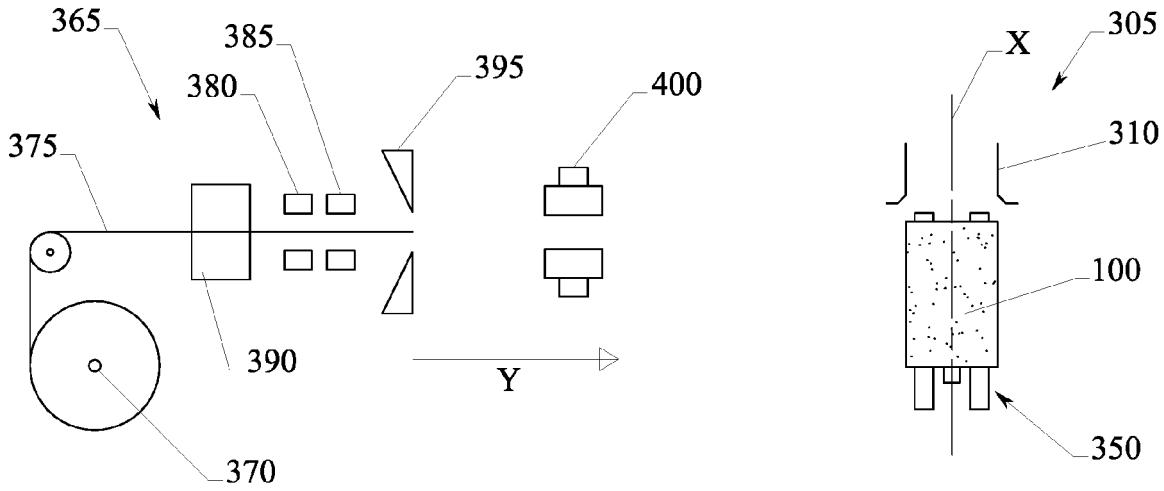

FIG.7

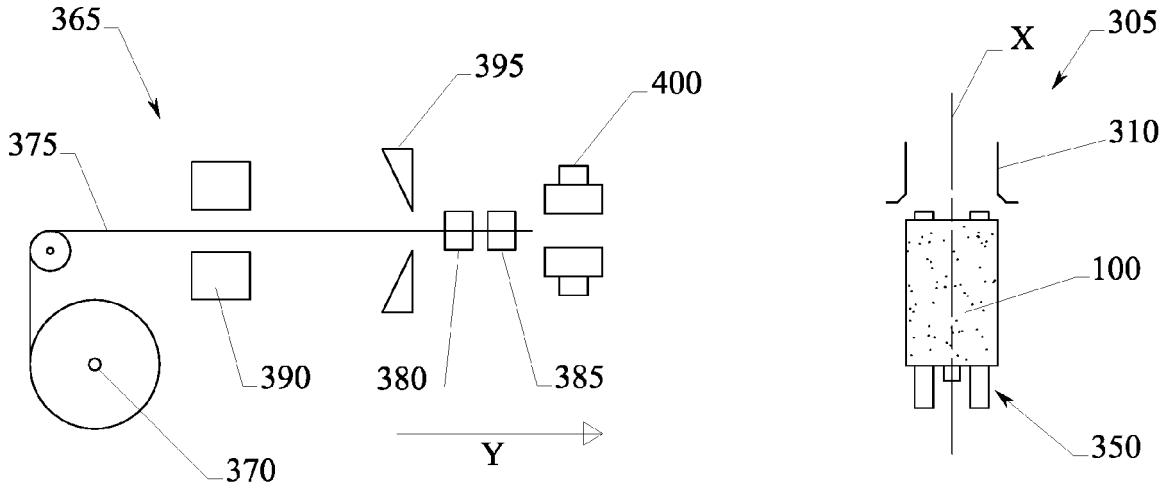

FIG.8

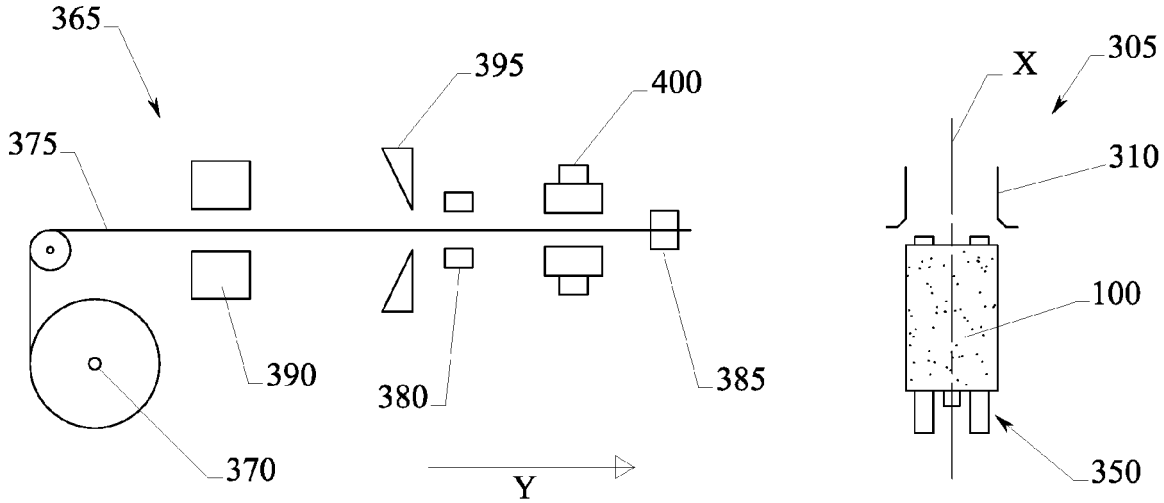

FIG.9

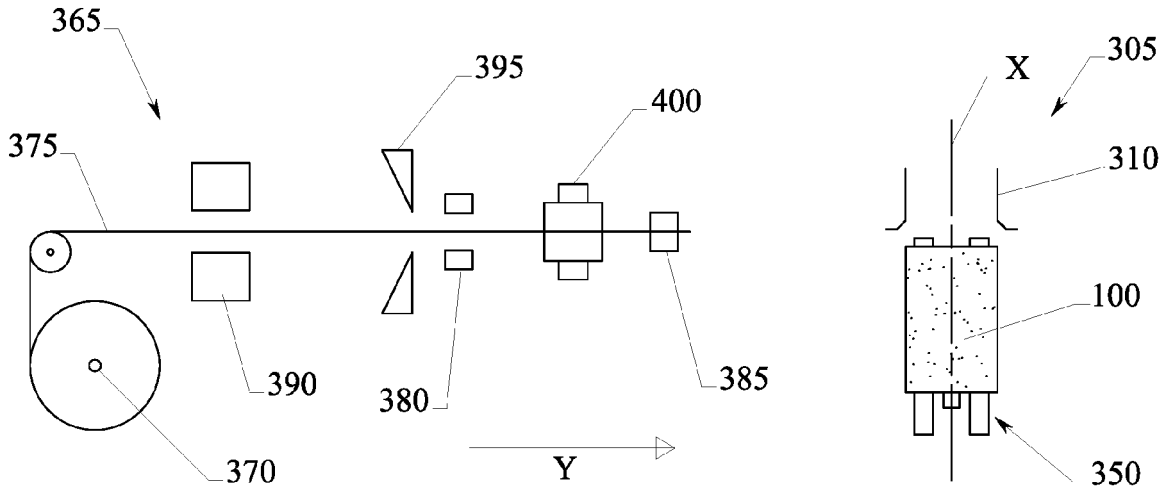

FIG.10

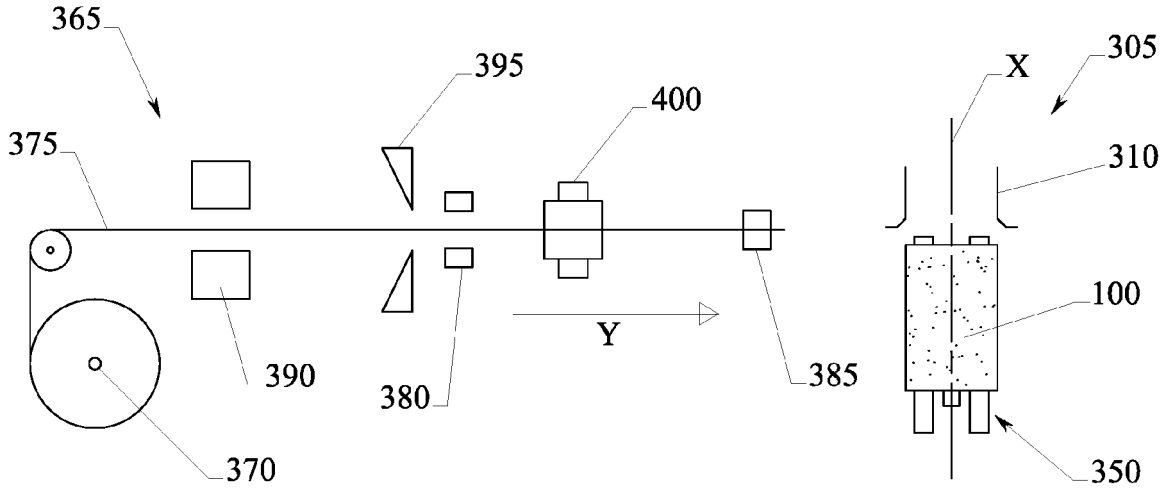

FIG.11

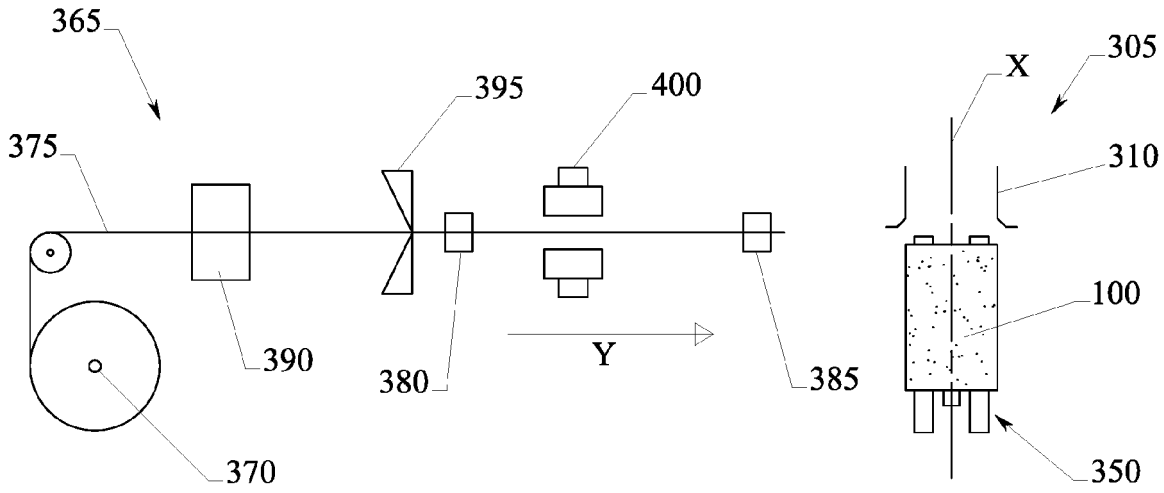

FIG.12

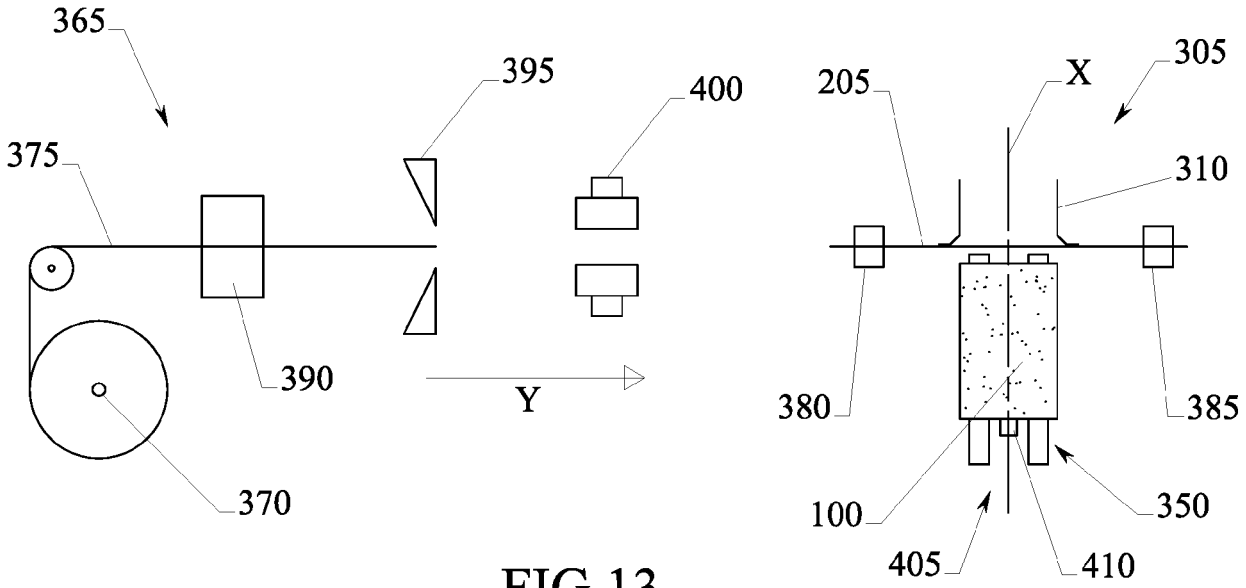
365
395
400
375
390
Y
370
205
X
305
310
380
385
100
350
405
410

FIG.13

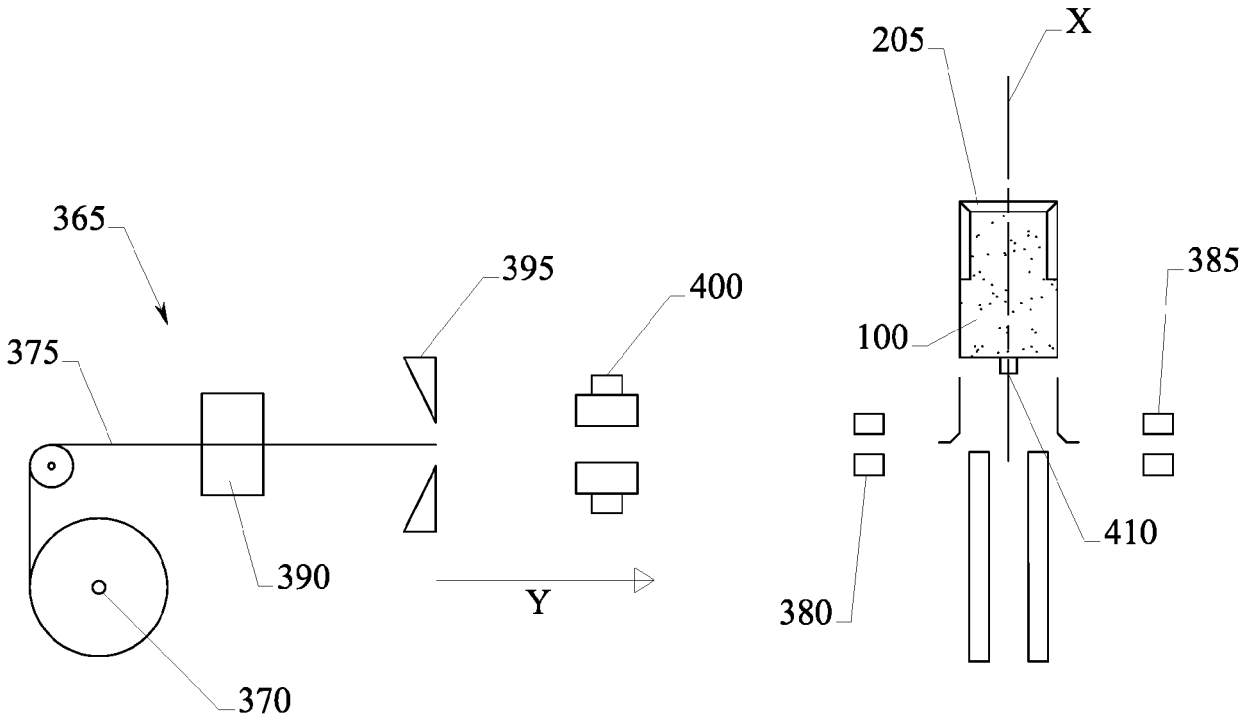
365
395
400
375
390
Y
370
205
X
385
100
410
380

FIG.14

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 17 1928

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 988 020 A1 (SITMA SPA [IT]) 5 November 2008 (2008-11-05) * paragraphs [0001] - [0053] * * figures 1-8 *	1-6,8-11	INV. B65D85/804 B65D85/46 B65D71/06 B65D81/05
Y	WO 2012/172485 A1 (NUOVA SIMA SPA [IT]; BARDI MAURIZIO [IT]) 20 December 2012 (2012-12-20) * pages 1-12 * * figures 1-6b *	1-6, 8-11, 14-18	B65B23/20 ADD. B65D75/00
Y	DE 40 31 917 A1 (MEURER MASCHINEN GMBH & CO KG [DE]) 2 May 1991 (1991-05-02) * columns 1-4 * * figure 4 *	1-6, 8-11, 14-18	
Y	US 2015/306849 A1 (LOPEZ LUIS ARTURO [US]) 29 October 2015 (2015-10-29) * pages 1-3 * * figures 1-4 *	1-6, 8-11, 14-18	
Y	WO 2014/091320 A1 (NUOVA SIMA SPA [IT]) 19 June 2014 (2014-06-19) * pages 1-9 * * figures 1-8 *	1-6, 8-11, 14-18	
A	FR 2 621 895 A1 (PARISOT STE NLE FABRIQUES MEUB [FR]) 21 April 1989 (1989-04-21) * pages 1-10 * * figures 1-3 *	1-24	
A	US 5 450 965 A (COX KENNETH L [US]) 19 September 1995 (1995-09-19) * column 2, line 5 - column 4, line 23 * * figures 1-5 *	1-24	

TECHNICAL FIELDS SEARCHED (IPC)

B65D
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 June 2017	Duc, Emmanuel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 17 1928

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-06-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1988020 A1	05-11-2008	AT 479601 T	15-09-2010
		BR PI0801347 A2	01-12-2009
		CA 2629633 A1	30-10-2008
		DK 1988020 T3	03-01-2011
		EP 1988020 A1	05-11-2008
		ES 2351927 T3	14-02-2011
		HK 1122253 A1	25-03-2011
		HR P20100636 T1	31-12-2010
		JP 5354948 B2	27-11-2013
		JP 2008285231 A	27-11-2008
		PT 1988020 E	03-12-2010
		SI 1988020 T1	31-01-2011
		US 2008269035 A1	30-10-2008
WO 2012172485 A1	20-12-2012	CN 103619730 A	05-03-2014
		EP 2714548 A1	09-04-2014
		WO 2012172485 A1	20-12-2012
DE 4031917 A1	02-05-1991	NONE	
US 2015306849 A1	29-10-2015	NONE	
WO 2014091320 A1	19-06-2014	CN 104661919 A	27-05-2015
		EP 2897869 A1	29-07-2015
		ES 2570381 T3	18-05-2016
		WO 2014091320 A1	19-06-2014
FR 2621895 A1	21-04-1989	NONE	
US 5450965 A	19-09-1995	CA 2139248 A1	30-06-1995
		US 5450965 A	19-09-1995

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82