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(72) Inventors:
• **Della Valentina, Angelo**
33070 Polcenigo (PN) (IT)
• **Toneatti, Rudi**
33090 Sequals (PN) (IT)

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(74) Representative: **Petraz, Gilberto Luigi et al**
GLP S.r.l.
Piazzale Cavedalis 6/2
33100 Udine (IT)

(71) Applicant: **Divti Quartagamma Srl**
33090 Sequals (PN) (IT)

(54) **Method and plant for packaging fresh food products, such as fruit and vegetables, and food product thus packaged**

(57) A method for packaging a fresh food product (20), such as fruit and vegetables, provided externally with a protective peel, comprises at least a peeling step, in which the peel is removed from said product (20). After the peeling step, the method comprises at least a cover-

ing step, in which at least a covering film is associated with the external surface of said product (20). The method also comprises a molding step in which said covering film is made to adhere to the external surface of said product (20).

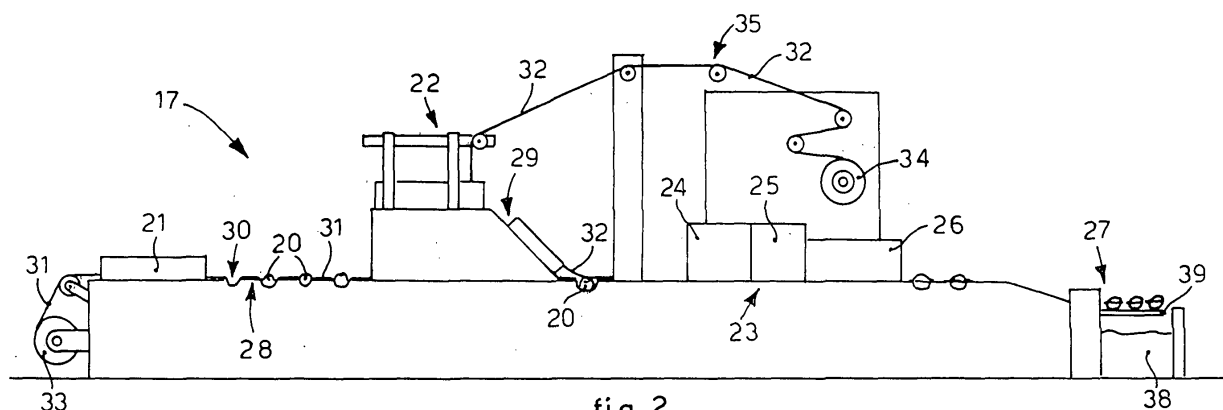


fig. 2

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a method and the relative plant for packaging fresh food products, such as fruit and vegetables. In particular, the present invention is used for packaging fresh fruit and vegetables, for example apples, pears, oranges, carrots, bananas and others, intended for individual distribution in automatic distributors in public places.

BACKGROUND OF THE INVENTION

[0002] Fresh food products are known, such as fruit and vegetables, commonly sold retail and in large scale retail outlets, loose or disposed on containers or boxes made of plastic, wood or cardboard.

[0003] The products are generally sold complete with the peel which is removed, if necessary, by the consumer when they are eaten.

[0004] The products are necessarily sold with the peel due to the fact that the desired freshness of the product on the counter must be guaranteed at least for some days.

[0005] In fact, if they are preserved with the peel in a cool dry place, the products keep their organoleptic properties substantially unchanged for some days whereas, if they have no peel, they deteriorate in the space of a few hours, due to the effect of the oxidation of the hydroquinones inside them.

[0006] The habit of having quick snacks with fresh, natural products is becoming more and more common, even outside the house, as an alternative to the high-caloric food that is typical of long-preservation snacks with additives, produced industrially.

[0007] However, fresh products, like fruit and vegetables, for example apples, pears, carrots, and others, are difficult to distribute individually in traditional automatic snack distributors.

[0008] This is due to the fact that, since it is necessary to guarantee a practical and speedy consumption for the user, also considering that natural products must be preserved with their peel, if they were to be distributed in automatic distributors, this would entail a simultaneous distribution of utensils in order to remove the peel at the moment of consumption.

[0009] Furthermore, if the product is peeled, there are problems relating to the juice which, to a lesser or greater extent, can come out of the product and dirty the user's hands or stain his/her clothes.

[0010] The need to distribute fresh products such as fruit and vegetables individually is even more prevalent in school institutions, since it is preferable that children's diet should include fruit and vegetables for a correct intake of fibers and vitamins, and that the consumption of industrially produced quick snacks should be reduced. Children, however, are unable to use cutting utensils ef-

ficiently and with due attention in order to remove the peel from fruit and vegetables and are therefore obliged to eat such products with the peel. Very often, even if washed, the peel has chemical products used in agriculture, wax or microorganisms.

[0011] Purpose of the present invention is to perfect a method, and the relative plant, to distribute individually fresh food products by means of automatic distributors, guaranteeing both that the organoleptic properties of the natural fresh product are maintained without using preservatives and/or additives of various types, and also that the products can be consumed in a practical and rapid manner, substantially for every type of user.

[0012] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0013] The present invention is set forth and characterized in the independent claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0014] In accordance with the above purpose, a method for packaging fresh food products, such as fruit and vegetables provided on the outside with a protective peel, comprises at least a peeling step, in which the peel is removed from said product.

[0015] According to a characteristic feature of the present invention, after the peeling step, at least a covering step is provided, in which at least a film of material, advantageously but not necessarily totally or partly transparent, is associated with the external surface of the food product, and a molding step in which the film is made to adhere to the external surface of the food product.

[0016] According to a variant, the film is made of thermo-formable material.

[0017] With this method we obtain a natural product in which the film replaces the peel in its functions of protecting and preserving the product but, unlike the peel, it is easily removed without the aid of utensils. Moreover, the bulk of the package is substantially equal to that of the non-packaged product, and therefore suitable for the limited spaces of the compartments of automatic distributors.

[0018] According to a variant, the covering step provides a first shaping sub-step, in which a first film is shaped to define a seating, having a shape correlated to the product, a second positioning sub-step in which the product is deposited in the seating, and a third covering sub-step in which a second film is positioned above the first film so as to cover the whole surface of the product.

[0019] In this way it is also possible to package products substantially spherical in shape, without the film forming bends and overlapping on the surface of the product.

[0020] According to a variant, in the case of thermo-

formable film, after the molding step, a step of heat-retraction is provided, in which the film is made to shrink so as to adhere further to the surface of the product.

[0021] This solution allows to increase further the adherence of the film to the product, with a final result that simulates the peel.

[0022] According to a variant, before the covering step, the present invention comprises a step of anti-oxidizing treatment, in which the peeled product is treated with an anti-oxidant solution in order to delay browning and to increase duration.

[0023] According to a variant, the molding step provides a sub-step to create a vacuum, in which the air between the film and the product is taken in.

[0024] This operation, eliminating or reducing the presence of oxygen in contact with the product, reinforces the effect of the anti-oxidizing treatment and allows to further extend the duration of the product.

[0025] According to another variant, after the vacuum step, the molding step comprises a sealing step in which the film is made solid in a closing zone, and a trimming sub-step in which the film is trimmed along the line of solidarization.

[0026] Solidarization makes the package hermetic, thus preventing any contamination of the product by external agents and also prevents any air from entering.

[0027] According to a variant, before the step of anti-oxidizing treatment, the method comprises a cutting step, in which the product is cut into portions of a predefined shape, for example segments or round pieces, which are kept together to form the original shape of the product.

[0028] This solution is particularly advantageous in the case of products intended for distribution in public places, such as for example hospitals, rest homes and schools, frequented by consumers who need to be able to eat the product in pieces that are easily picked up by hand, and not bitten.

[0029] According to another variant, the film is a color that reproduces the appearance of the packaged food product. In this way, the product is more easily recognizable by the consumer and is aesthetically more pleasing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic view of a packaging plant according to the present invention;
- fig. 2 is a lateral schematic view of a detail of the plant in fig. 1;
- fig. 3a is a lateral view of a product during the packaging step with the plant in fig. 1;
- fig. 3b is a three-dimensional view of a part of fig. 3a;
- fig. 4 is a perspective view of the packaged product

made with the plant in fig. 1;

- fig. 5 is a block diagram of a packaging method according to the present invention.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0031] With reference to the attached drawings, a plant 10 according to the present invention is used to package fresh food products, in this case apples.

[0032] The following example provides to use film made of thermo-formable material.

[0033] With particular reference to fig. 1, the plant 10 comprises a loading station 11, a washing tank 12, a peeling station 13, a grading station 14, an anti-oxidizing treatment tank 15, a drying station 16 and a packaging station 17.

[0034] The loading station 11, washing tank 12, peeling station 13, grading station 14, anti-oxidizing treatment tank 15 and drying station 16 are substantially of a known type.

[0035] In particular, the apples 20 are loaded into the loading station 11 and made to slide into the washing tank 12 in which they are washed, generally with water.

[0036] The washing tank 12 comprises lifting means that pick up the apples 20 and convey them toward the peeling station 13.

[0037] The peeling station 13 comprises an orientation device that rotates the apples 20 until the stalk-sepal axis is in a vertical direction, and peeling means that peel the apples 20, for example by turning, and possible remove the core.

[0038] In the grading station 15, for example comprising a conveyor belt, the apples 20 that are unsuitable are identified and discarded, either manually or automatically.

[0039] The suitable apples 20 are immersed for a determinate period of time in the anti-oxidizing treatment tank 15, containing an anti-oxidant solution, for example a solution of ascorbic acid, and are subsequently dried in the drying station 16 for example by means of ventilators.

[0040] With particular reference to fig. 2, the packaging station 17 comprises shaping means 21, feed means 28, covering means 22, a sealing unit 23 and heat-retraction means 27.

[0041] The packaging station 17 also comprises a first unwinding roller 33, disposed upstream of the shaping means 21, and able to feed to the shaping means 21 a first film 31 of thermo-formable material, in the form of a strip, and a second unwinding roller 34, associated with the covering means 22 and able to feed to the covering means 22 a second film 32 of thermo-formable plastic material, in the form of a strip.

[0042] The shaping means 21 comprise a mold with a shape correlated with the shape of part of the apple 20 to be packaged, able to pre-form the first film 31.

[0043] In this case the mold is shaped to pre-form the

first film 31 so that it covers more than half of the apple 20, excluding an upper cap.

[0044] By molding, a seating 30 is formed on the strip (figs. 3a and 3b) into which the apple is placed manually when it exits from the shaping means 21.

[0045] The feed means 28 are provided immediately downstream of the shaping means 21.

[0046] In this case, the feed means 28 comprise two chains disposed parallel at a distance equal to the width of the first film 31, each of which is disposed annularly on two pulleys. The pulleys, which cannot be seen in the drawings, are disposed respectively one immediately upstream of the shaping means 21, and one immediately downstream of the sealing unit 23.

[0047] An edge of the first film 31 is associated with each chain, to feed it toward the sealing unit 23.

[0048] In this way the first film 31 also functions as a conveyor belt for the apples 20.

[0049] According to a variant, downstream of the shaping means 21, in the direction of feed of the first film 31, positioning means are provided, able to position the apple 20 in the seating 30 in an automated manner.

[0050] Downstream of the shaping means 21 and upstream of the sealing unit 23 the covering means 22 are disposed, comprising a plurality of tensioning rollers 35 and a positioning device 29, which gradually position the second film 32 above the apples 20 during the advance of the first film 31 and the apples 20 from the shaping means 21 to the sealing unit 23.

[0051] The second film 32 advances solid with the first film 31 toward the sealing unit 23.

[0052] The sealing unit 23 comprises a vacuum formation device 24 which takes in the air present between the two films 31 and 32 and the surface of the apple 20.

[0053] The sealing unit 23 also comprises sealing means 25 that weld the two films 31 and 32 to each other in the perimeter zone of the apple 20. The films are welded using known methods, for example melting, pressure, laser or other.

[0054] The sealing unit 23 comprises trimming means 26, disposed downstream of the sealing means 25, which cut the two films 31 and 32 along the edge of the sealed portion 37 (fig. 4).

[0055] Advantageously, the trimming means 26 shape a tongue 36, comprising a portion of the same shape and size as each of the two films 31 and 32. A longitudinal cut 40 is made on the tongue 36, for an easy opening of the package.

[0056] The sealing unit 23 feeds the heat-retraction means 27.

[0057] The heat-retraction means 27 comprise a heat-retraction tank 38 containing hot water, at a temperature such as to cause the films 31 and 32 to shrink, and a holed platform 39, disposed movable vertically inside the heat-retraction tank 38.

[0058] The covered apples 20 are loaded, manually or by means of automatic devices, onto the platform 39 when the latter is at a level above the surface of the water

of the heat-retraction tank 38. Subsequently, the platform 39 moves downward to a level where the apples 20 are completely immersed in the water. The platform 39 remains in this position for the time needed for the films 31 and 32 to shrink, and then returns to the initial level, above the surface of the water.

[0059] The holes of the platform 39 are able to drain the apples 20 of residual water after immersion.

[0060] According to a variant, the packaging station 17 provides a device, associated with the shaping means 23, to recover the off cuts from the trimming of the films 31 and 32.

[0061] The device to recover the off cuts is for example of the suction type, and comprises a plurality of suction tubes disposed in correspondence with the trimming means 26.

[0062] It is clear, however, that modifications and/or additions of parts may be made to the plant 10 as described heretofore, without departing from the field and scope of the present invention.

[0063] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of plant for packaging fresh food product, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Method for packaging a fresh food product (20), such as fruit and vegetables, provided externally with a protective peel, comprising at least a peeling step, in which the peel is removed from said product (20), **characterized in that** after the peeling step, it comprises at least a covering step, in which at least a covering film is associated with the external surface of said product (20), and a molding step in which said covering film is made to adhere to the external surface of said product (20).
2. Method as in claim 1, **characterized in that** the molding step comprises a sealing sub-step in which the covering film is made solid in correspondence with a predefined closing zone, and a trimming sub-step in which said covering film is trimmed along the edge of the portion (37) made solid.
3. Method as in claims 1 or 2, **characterized in that** the molding step comprises a sub-step of creating a vacuum, in which the air present between said covering film and said product (20) is taken in.
4. Method as in claims 1 or 3, **characterized in that** said covering step provides a first shaping sub-step, in which a first film (31) is shaped so as to define a seating (30) having a shape correlated to the product

- (20), a second positioning sub-step in which said product (20) is deposited in said seating (30), and a third covering sub-step in which a second film (32) is positioned above the first film (31) so as to cover the whole surface of the product (20).
5. Method as in claim 4, **characterized in that**, in said molding step, said second film (32) is deposited so as to assume a shape correlated to the product (20). 5
 6. Method as in claims 4 or 5, **characterized in that** said molding step comprises a sealing sub-step in which said first film (31) and said second film (32) are made solid with each other along a predefined peripheral portion, and a trimming sub-step in which said first film (31) and said second film (32) are trimmed along the edge of the portion (37) made solid. 10
 7. Method as in any claim hereinbefore, **characterized in that**, before the covering step, it comprises an anti-oxidizing treatment of said product (20). 15
 8. Method as in claim 7, **characterized in that**, before the anti-oxidizing treatment, it comprises a cutting step in which said product (20) is pre-cut into portions of a predefined shape which are kept associated so as to form the original shape of the product (20). 20
 9. Method as in any claim hereinbefore, **characterized in that**, after the molding step, a step of heat retraction is provided, in which said covering film is made to shrink so as to adhere further to the surface of the product (20). 25
 10. Plant for packaging a fresh food product (20), such as fruit and vegetables, provided externally with a protective peel, comprising at least a peeling station (13), able to remove the peel from said product (20), **characterized in that** it comprises a packaging station (17) provided at least with a covering unit, able to position at least a covering film on the external surface of said product (20), and a sealing unit (23), able to make said covering film adhere to the surface of said product (20). 30
 11. Plant as in claim 10, **characterized in that** said sealing unit (23) comprises a device (24) to create a vacuum, disposed downstream of said covering unit and able to take in the air present between said covering film and said product (20). 35
 12. Plant as in claims 10 or 11, **characterized in that** said sealing unit (23) comprises sealing means (25), able to make solid said covering film in correspondence with a predefined closing zone, and trimming means (26), disposed downstream of said sealing means (25) and able to trim said covering film along the edge of the portion made solid. 40
 13. Plant as in claims 10 or 11, **characterized in that** said covering unit comprises shaping means (21), able to shape a first film (31) so as to define a seating (30) having a shape correlated to that of the product (20), and in which said product (20) is deposited, and covering means (22), cooperating with said shaping means (21) and able to position a second film (32) above the first film (31) so as to cover the whole surface of the product (20). 45
 14. Plant as in any claim from 10 to 13, **characterized in that** said packaging station (17) comprises heat retraction means (27), disposed downstream of said sealing unit (23) and able to shrink said covering film. 50
 15. Fresh food product, such as fruit and vegetables, without the protective peel, **characterized in that** it is packaged by means of a packaging method comprising at least a covering step, in which at least a covering film is associated with the external surface of said product (20), and a molding step in which said covering film is made to adhere to the external surface of said product (20). 55
 16. Product as in claim 15, **characterized in that** a first film (31), shaped to define a seating (30) having a shape correlated to the product (20), and a second film (32), positioned above the first film (31) so as to cover the whole surface of the product (20), are associated with the external surface of the product (20).

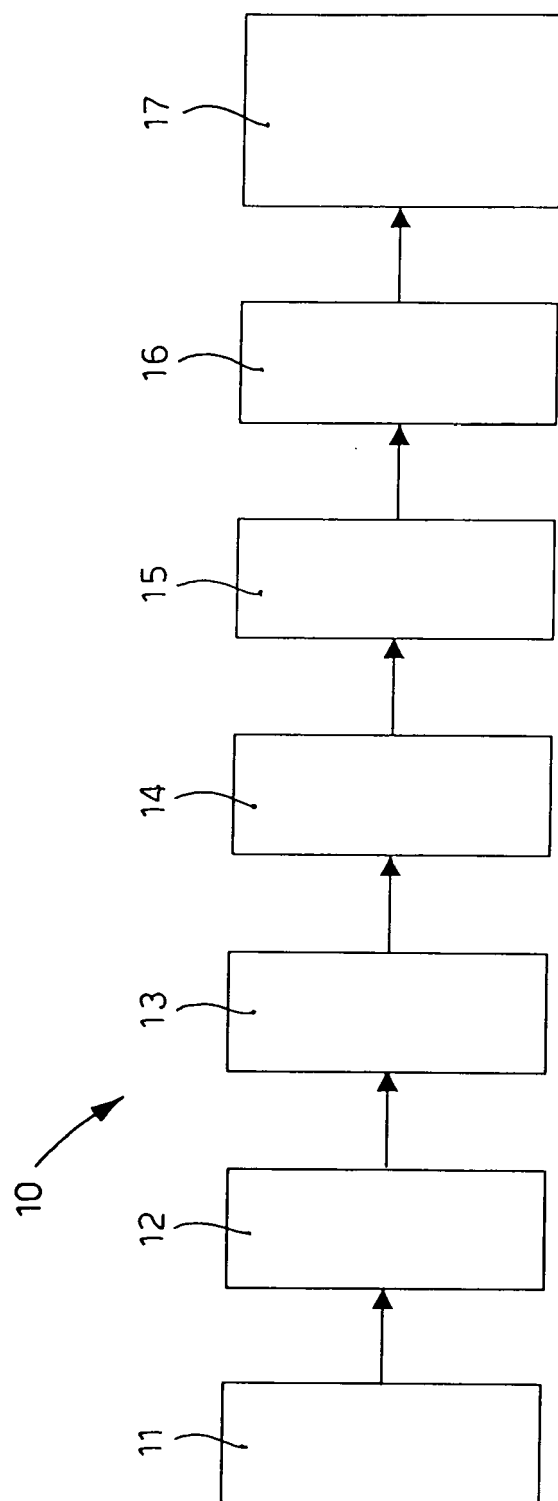
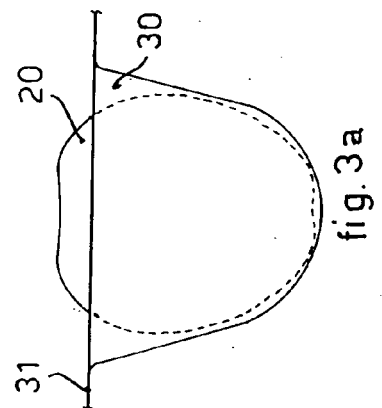
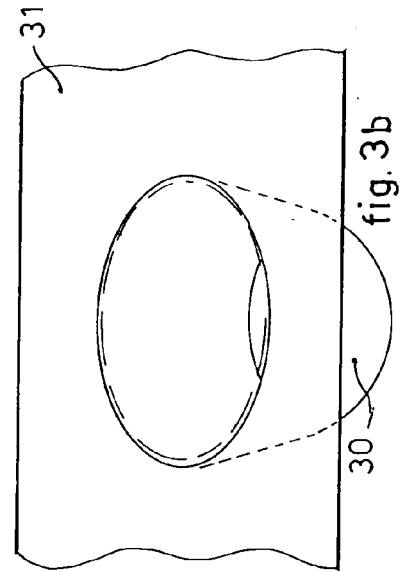
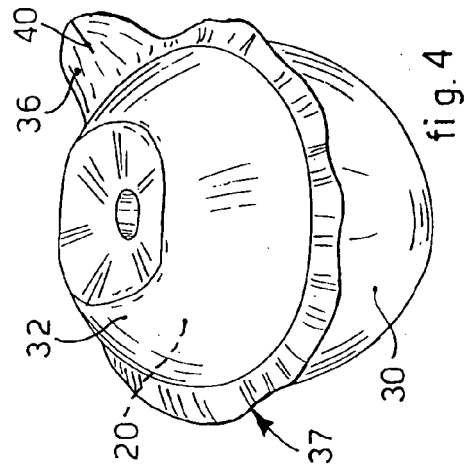
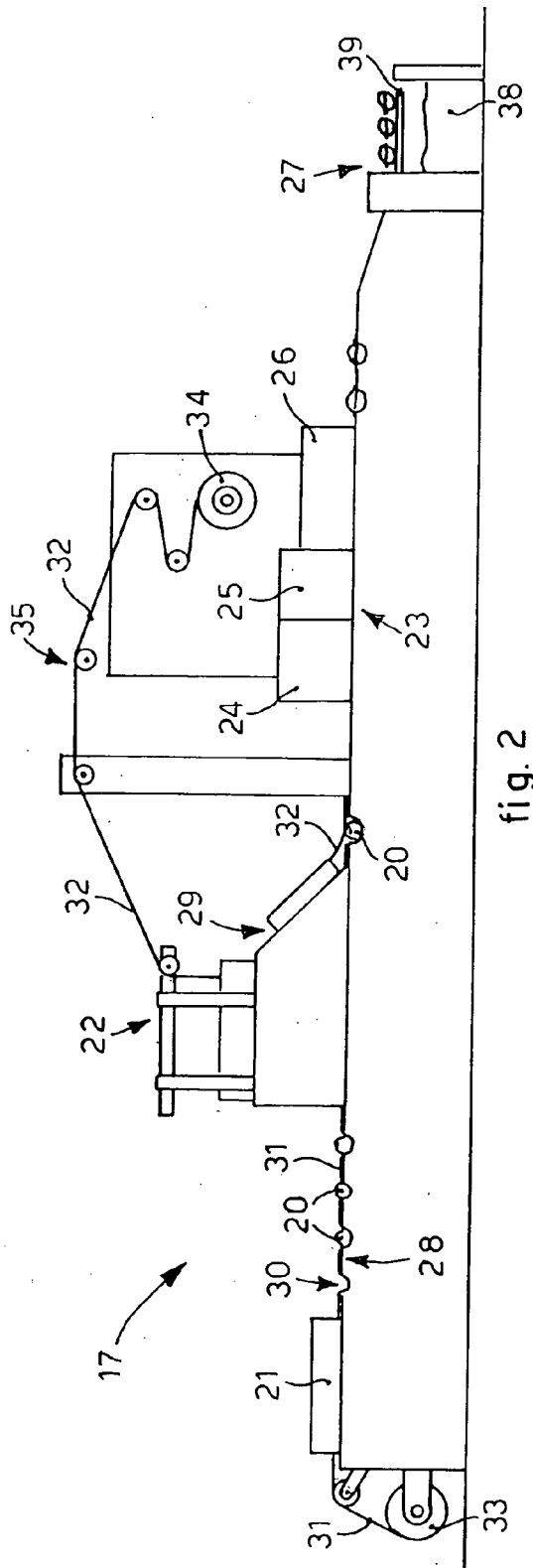


fig. 1



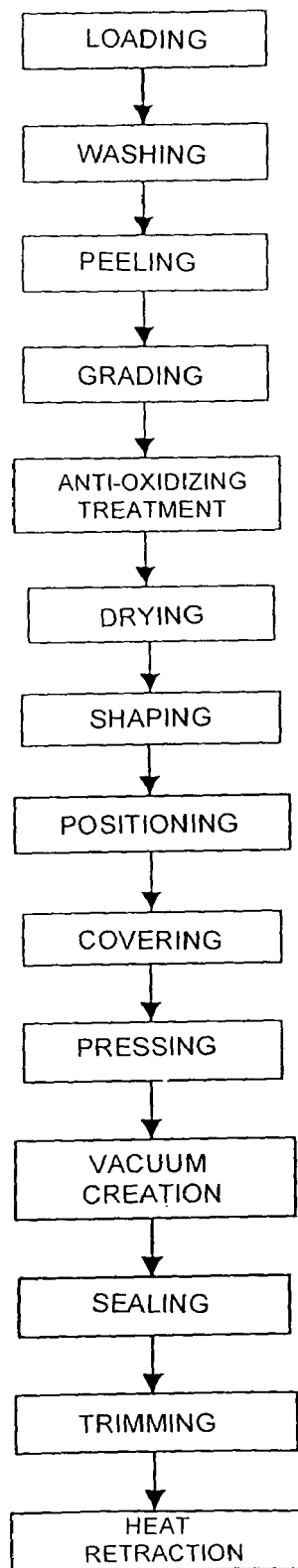


fig. 5