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(54) **Wrapped-product quality control and packing methods, and wrapped-product quality control and packing devices.**

(57) A wrapped-product quality control method and a wrapped-product packing method comprise providing a wrapped product comprising a product in a wrapper; supplying the wrapped product on a measuring background in a capture range of an infrared sensitive imaging device, the product having a product temperature different from a measuring background temperature of the measuring background, and the wrapper having a wrapper temperature; capturing with the infrared-sensitive imaging device infrared radiation from the wrapped product and the measuring background; providing an image of the product or of the wrapped product from said infrared radiation captured with said infrared-sensitive imaging device; and analysing said image for quality control of said wrapped product. A wrapped-product quality control device and a wrapped-product packing device comprise an infrared-sensitive imaging device configured and arranged for capturing infrared radiation from a wrapped product on a measuring background, the product having a product temperature different from a measuring background temperature of the measuring background, and the wrapper having a wrapper temperature; and a computer for providing an image of the product or of the wrapped product from the infrared radiation captured with the infrared-sensitive imaging device, and for analysing the image for quality control of the wrapped product.

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Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

Wrapped-product quality control and packing methods, and wrapped-product quality control and packing devices

5 The present invention relates to wrapped-product quality control and packing methods, and wrapped-product quality control and packing devices.

 Generally products, like ice creams, can be packed in a wrapper, such as a plastic or paper-like sheet or box. One or a multiple of such wrapped products may be packed in a packing container, like a cardboard box or a flexible bag. When producing the product, or during its wrapping or transport the product may become damaged or otherwise not satisfy certain quality standards with respect to its appearance or integrity. One therefore likes to do a quality check of the wrapped product, which can be done just before packing the wrapped product into a packing container, or can be combined with packing into the packing container. When the product concerns an ice cream, for instance, it might be cracked or broken into parts. In case of an ice cream on one or more sticks, such stick may not be inserted properly into the ice cream, it may be broken, or stick out of the wrapper. One likes to prevent such wrapped products of insufficient quality from being packed in a packing container and shipped for sale. However, such an integrity check for quality control purposes is not readily available.

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 It is therefore an aim of the invention to provide a quality control method that can be easily integrated in the handling process of wrapped products by providing a wrapped-product control method comprising providing a wrapped product comprising a product in a wrapper; supplying said wrapped product on a measuring background in a capture range of an infrared-sensitive imaging device, said product having a product temperature different from a measuring background temperature of said measuring background, and said wrapper having a wrapper temperature; capturing with said infrared-sensitive imaging device infrared radiation from said wrapped product and said measuring background; providing an image of said product and/or of said wrapped product from said infrared radiation captured with said infrared-sensitive imaging device; and analysing said image for quality control of said wrapped product.

 Part of the wrapper not in contact with the product will generally have a

temperature not equal to the product, which causes such part of the wrapper to radiate infrared radiation having certain spectral distribution that is different from a spectral distribution of infrared radiation radiated by the product and part of the wrapper in contact with the product. The method allows discriminating the product from its wrapper and therefore a view on an image of the product so that the product can be quality checked.

On the other hand the spectral distribution of infrared radiation radiated from said product and its wrapper can both be different from the measuring background, which allows discriminating product and wrapper from the background and therefore a view on a combined image of product and wrapper for a further quality check of the wrapped product.

In an advantageous embodiment of the wrapped-product control method said wrapped product is supplied on a conveyer, said conveyer providing said measuring background. The wrapper will be in contact with the conveyer and the surroundings thereof, and the part of the wrapper not in contact with the product will take the temperature of the conveyer to provide a temperature difference between such part of the wrapper and the product for a good discrimination of product from wrapper.

In another advantageous embodiment said wrapped product is supplied by a conveyer over a measuring surface having a temperature different from said product temperature and different from a temperature of said conveyer, said measuring surface providing said measuring background. When provided onto the measuring surface from the conveyer, part of the wrapper not in contact with the product will still have or be close to the temperature of the conveyer. Measuring surface, part of the wrapper not in contact with the product, and the product will have different temperatures and will thus radiate infrared radiation with different spectral distributions. They can therefore be easily discriminated from one another.

In yet another advantageous embodiment said step of supplying said wrapped product is performed shortly after said product has been wrapped in said wrapper such that said wrapper temperature is different from said product temperature. This allows an straightforward discrimination of product and wrapper due to their temperature difference. Having a short time period between wrapping and measuring results in the wrapper end the product having different temperatures, which makes the discrimination easier.

In a preferred embodiment of the wrapped-product control method said step of providing said image comprises dividing an area captured by said infrared-sensitive imaging device into a two-dimensional matrix of pixels; assigning a pixel temperature to each pixel based on a measured distribution of infrared radiation associated with said pixel; selecting a threshold temperature in between said product temperature and said wrapper temperature or in between said wrapper temperature and said measuring background temperature, said product temperature being in a product temperature range that at one end is delimited by said threshold temperature; selecting pixels having an associated pixel temperature being in said product temperature range; and building said image from said selected pixels. Such embodiment provides an efficient and reliable manner or providing images of the product or the wrapped product for quality control purposes.

In yet another preferred embodiment said step of analysing comprises comparing said image with a reference image. Such embodiment provides an efficient and reliable manner of analysing the image for the intended quality control purposes.

In another aspect the invention provides a wrapped-product packing method for packing a wrapped product into a packing container, said method comprising the wrapped product quality control method according to the invention; packing said wrapped product into said packing container when said wrapped product has passed said quality control; and rejecting said wrapped product when said wrapped product has failed said quality control. Performing the wrapped-product quality control method as part of a wrapped-product packing method guarantees that the packed wrapped products have passed the quality control test.

In an advantageous embodiment said step of rejecting said wrapped product comprises removing said wrapped product.

In another advantageous embodiment said step of packing said wrapped product comprises using a gripping device to pick up said wrapped product and providing said wrapped product into said packing container.

In yet another advantageous embodiment said step of packing said wrapped product comprises localizing said wrapped product using said infrared-sensitive imaging device. Such embodiment efficiently employs the infrared-sensitive imaging device both for quality control and for localizing purposes.

In yet another aspect the invention provides a wrapped-product quality control

device for quality control of a wrapped product, said wrapped product comprising a product in a wrapper, said device comprising an infrared-sensitive imaging device configured and arranged for capturing infrared radiation from a wrapped product on a measuring background, said product having a product temperature different from a measuring background temperature of said measuring background, and said wrapper having a wrapper temperature; and a computer configured and arranged for providing an image of said product or of said wrapped product from said infrared radiation captured with said infrared-sensitive imaging device, and for analysing said image for quality control of said wrapped product. Such device is capable to perform the wrapped-product quality control method according to the invention.

In an advantageous embodiment the wrapped-product quality control device comprises a conveyer for conveying said wrapped product, said conveyer providing said measuring background.

In another advantageous embodiment the device comprises a conveyer for conveying said wrapped product, said conveyer providing said wrapped product over a measuring surface having a temperature different from said product temperature and different from a temperature of said conveyer, said measuring surface providing said measuring background.

In yet another aspect the invention provides a wrapped-product packing device for packing wrapped products into a packing container, said device comprising the wrapped product quality control device according to the invention; a packing station for packing wrapped products that have passed said quality control of said wrapped product quality control device into said packing container. Such device is capable to perform the wrapped-product packing method according to the invention.

In an advantageous embodiment the wrapped-product packing device comprises a removing mechanism for removing a wrapped product that has not passed said quality control of said wrapped product quality control device.

In another advantageous embodiment said packing station and/or said removing mechanism comprises a gripping device for picking up said wrapped product.

In yet another embodiment said wrapped-product packing device is configured and arranged such that said gripping device picks up said wrapped product based on a position of said wrapped product determined using said infrared-sensitive imaging device.

In embodiments of the methods and devices according to the invention, said product is a frozen product.

In other embodiments of the methods and devices according to the invention, said frozen product is an ice cream.

5 In yet other embodiments of the methods and devices according to the invention, said wrapper is a non-metallic wrapper. A non-metallic wrapper generally has a low heat conduction and therefore will not easily take the temperature of the product, which allows a more straightforward discrimination of wrapper and product.

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The invention will further be explained by reference to the accompanying drawings, in which same reference symbols indicate like or same parts, and in which

Figure 1a shows an ice cream on a stick within a wrapper, the ice cream not presenting any integrity or other quality defects;

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Figure 1b shows an image of the ice cream and its stick shown in figure 1a as determined using infrared radiation measured with an infrared imaging device;

Figure 1c shows an image of the wrapped ice cream of figure 1a as determined using infrared radiation measured with an infrared imaging device;

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Figures 2a, 2b and 2c correspond to figures 1a, 1b and 1c, respectively, but present a defective ice cream in two pieces;

Figures 3a, 3b and 3c correspond to figures 1a, 1b and 1c, respectively, but present a defective ice cream having a stick that is connected to the ice cream at a wrong angle;

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Figures 4a, 4b and 4c correspond to figures 1a, 1b and 1c, respectively, but present a defective ice cream missing a part;

Figures 5a, 5b and 5c correspond to figures 1a, 1b and 1c, respectively, but present a defective ice cream having a broken stick;

Figures 6a, 6b and 6c correspond to figures 1a, 1b and 1c, respectively, but present a defective wrapped ice cream having the stick sticking out of the wrapper;

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Figure 7 shows a wrapped-product packing device having a wrapped product quality control device, both according to the invention; and

Figures 8a and 8b show diagrams of product, wrapper, measuring background and threshold temperatures, and a product temperature range.

A product in the form of an ice cream 11 on a stick 12 is shown in figure 1a. The figure shows the ice cream to have one stick, but it may also be an ice cream on a double stick or an ice cream without a stick. The ice cream 11 is wrapped in a wrapper 13. In the embodiment shown the wrapper is a plastic wrapper in the form of a bag. However, the wrapper may also take the form of a box, such as a carton or plastic box. The ice cream in its wrapper provides a wrapped ice cream 10. In general, it provides a wrapped product 10. In the embodiment shown, the ice cream 11 has a length LI and a width WI, and its stick 12 has a length LS. The wrapper 13 has a length LW and a width WW. In the remainder of the description the product or ice cream is referred to by reference symbol 11. However, the ice cream product 11 may also include the stick 12, which should be apparent from its context.

Figures 2a, 3a, 4a, 5a and 6a show defective wrapped ice creams 10. In figure 2a the ice cream is cracked or broken into two parts, and shows a crack 11a. The ice cream of figure 3a has its stick 12 connected at a wrong angle. In figure 4a the ice cream shows missing part 11b. The stick 12 of the ice cream of figure 5a is broken into two parts, having a broken off part 12a. In figure 6a the ice cream is erroneously wrapped and has its stick 12 sticking out off its wrapper 13. One likes to recognize such defective wrapped products and prevent them from shipping for sale.

Figure 7 shows a wrapped-product packing apparatus or device 101 having a wrapped-product quality control apparatus or device 100 and a packing station 200. Without packing station 200 the figure would only show a wrapped-product quality control apparatus or device 100. Quite a few, but not all wrapped ice creams (wrapped products) are identified by reference symbol 10 in figure 7.

The wrapped-product quality control device 100 of the wrapped-product packing device 101 comprises infrared-sensitive imaging devices or cameras 110, 111. Such imaging devices 110, 111 are capable of location-resolved detecting infrared radiation radiated by wrapped products 10 and their surroundings. The embodiment is shown to have two infrared-sensitive imaging devices 110, 111 mainly for illustrative purposes, although it may have two such imaging devices in practice. A practical embodiment can also have only one such imaging device or even more than two of such imaging devices. A signal generated by the imaging devices 110, 111 is passed over connecting

lines 110a, 111a to a computer 115 for further processing and handling.

5 Wrapped ice creams 10 are transported by a conveyer 120 and are passed underneath the imaging devices 110, 111 in a conveying direction 120a. In the embodiment shown, the conveyer comprises a conveying belt 122 in the form of a web or plurality of strings made of rubber or plastic (or any other applicable material) and presenting openings in the web or in between the plurality of strings. The conveying web or plurality of strings 122 are passed over rollers (not shown) for guidance and exerting a driving force. The wrapped ice creams are supported by the conveying web or plurality of strings. In an alternative embodiment the conveyer may comprise a
10 conveyer belt with a closed surface.

 The ice creams 11 are frozen and will therefore be colder than the packing device 101 and the surroundings thereof. The part of the wrapper 13 not in direct contact with the ice cream will generally be warmer than the ice cream since it will have been heated due to contact with the conveyer 120 and the surrounding air. Infrared
15 radiation radiated by the wrapped ice cream 10 will be detected by infrared-sensitive imaging device 110 when the wrapped ice cream comes into the capturing range 110b of imaging device 110. The imaging device location-resolved detects infrared radiation within its capturing range and can therefore separately detect such radiation radiated by the ice cream, its wrapper and the background of the ice cream, which represents a
20 measuring background. For imaging device 110 the measuring background is given by the conveying web or plurality of strings and a plate 121 as part of the conveyer 120 below the conveying web or strings 122. The web or strings and the plate 121 are at a surrounding temperature, which thus represents a measuring background temperature of the measuring background.

25 The imaging devices 110, 111 divide their capturing ranges 110b, 111b into a two-dimensional grid or matrix of pixels. Such array of pixels 17 is partly and schematically shown in figure 1b. For each pixel 17 the imaging devices measure a distribution of infrared radiation radiated by an area associated with that pixel. An area having a certain temperature radiates infrared radiation according to a specific
30 wavelength distribution of that radiation. The area radiates infrared radiation at a specific relative intensity at an associated wavelength interval, the distribution being associated with the temperature of that area. Having measured the wavelength distribution of infrared radiation, one can therefore assign a temperature to the

measured area and associated pixel 17. A temperature can thus be assigned for each pixel in the capturing range of the imaging device. Such analysis and assignment of a temperature to each pixel is done by computer 115 to which signals corresponding to the measurements of the imaging device are passed over connecting lines 110a, 111a.

5 In the analysis a threshold temperature TT is selected. Such a threshold temperature can be selected in between a temperature TP of the ice cream or product and a temperature TW of part of the wrapper not in direct contact with the ice cream, or in between a temperature TW of part of the wrapper not in direct contact with the ice cream (which will be shortly referred to as the wrapper temperature TW) and a
10 measuring background temperature TM of the measuring background. A product temperature range PTR can be defined such that it comprises the temperature of the ice cream TP and that the range at one end is delimited by the threshold temperature TT. Figure 8a shows a product temperature range PTR for a threshold temperature TT in between product or ice cream temperature TP and wrapper temperature TW. Figure 8b
15 shows a product temperature range PTR for a threshold temperature TT in between wrapper temperature TW and measuring background temperature TM. For best results the wrapper 13 is a non-metallic wrapper, which does not screen the electromagnetic infrared radiation from the inside of the wrapper and does not easily take the temperature of the product 11.

20 In the analysis of the signal from imaging device 110 the threshold temperature TT is selected in between wrapper temperature TW and ice cream temperature TP. For the situation in capturing range 110b of imaging device 110 the wrapper temperature TW will be equal or almost equal to measuring background temperature TM. Pixels having an associated pixel temperature in the product
25 temperature range PTR are selected by computer 115 and an image is build from such pixels. Such image will be representative of the ice cream. Figures 1b, 2b, 3b, 4b, 5b and 6b show such images and the various defects in the ice creams corresponding to figures 2b, 3b, 4b and 5b become nicely visible. Crack 11a may show in the image of figure 2b when the separation between both parts of the ice cream is large enough.

30 In distinguishing images of defective ice creams the computer can compare the image with a reference image 15a as represented by the image of a non-defective ice cream in figure 1a. Such comparison and distinguishing methods by computer analysis are generally known and will not be further explained. The computer may also check

on certain parameters of the images, such as the length LI of the ice cream 11, the width WI of the ice cream and the length LS of the stick 12. Figure 2b shows that the width WI2 of the corresponding defective ice cream is larger than the width WI of the reference image 15a, and figure 5b shows that the length LS5 of the stick of the corresponding ice cream is shorter than stick length LS of the reference image 15a.

Having passed underneath imaging device 110 the wrapped products or ice creams 10 come into the capturing range 111b of imaging device 111. In the area of capturing range 111b a measuring plate 130 is provided underneath the conveyer web or plurality of strings. The temperature of measuring plate 130 is set a temperature that is elevated with respect to the temperature of the conveyer. The measuring plate 130 provides the measuring background having a measuring background temperature of the measuring plate. Since the wrapped product 10 will only spend a relatively short time above measuring plate 130, the wrapper 13 will not heat to the temperature of the measuring plate but substantially remain at the temperature of the conveyer before arriving above the measuring plate 130.

A same measurement and analysis as described for imaging device 110 can be done. However, since the ice cream temperature TP, wrapper temperature TW and measuring background temperature TM are different, a threshold temperature TT can now be selected in between TP and TW or in between TW and TM, as represented by both figures 8a and 8b, respectively. The images of figures 1b, 2b, 3b, 4b, 5b and 6b can be derived by setting the threshold temperature TT in between TP and TW. Further, the images of figures 1c, 2c, 3c, 4c, 5c and 6c can be derived by setting the threshold temperature TT in between TW and TM. Since the threshold temperature for imaging device 111 can be set in between TP and TW and in between TW and TM, the imaging device 110 can be dispensed with in the embodiment shown in figure 7.

The images of figures 1c, 2c, 3c, 4c, 5c and 6c correspond to the wrapped product or ice cream 10. The images of figures 2c, 3c, 4c and 5c all are identical to the reference image 16a of the non-defective wrapped product in figure 1c. The image in figure 6c deviates from the reference image 16a in figure 1c because the stick of the corresponding ice cream sticks out of the wrapper, which can be distinguished using computer 115 by comparing these images.

Based on the analysis of computer 115 the wrapped ice creams corresponding to figures 2a, 3a, 4a, 5a and 6a fail the quality control and can be rejected in a next step so

they will not be shipped for sale. The rejection step may comprise removing the wrapped product.

Having passed imaging device 111 and its corresponding capture range 111b the wrapped ice creams 10 arrive at packing station 200. The packing station comprises a gripper 210 for picking up wrapped ice creams from the conveyer 120. The gripper can locate the individual ice creams based on the location of the ice cream on the conveyer as determined using one or both imaging devices 110, 111 and the speed of the conveyer, all under the control of computer 115. Gripper 210 is therefore connected to computer 115 by connecting line 210a.

Gripper 210 can pick up individual wrapped ice creams 10 for packing them into a packing container 20, such as a cardboard box, that can hold a plurality of wrapped ice creams. After having picked up a wrapped ice cream the gripper is moved in direction 211 towards packing container 20. Wrapped ice creams can be packed in the packing container in any known fashion, which will not be further described.

Based on the location information of individual wrapped ice creams 10 and quality information on whether they have passed quality control or not, individual wrapped ice creams can be rejected at the packing station by not packing such wrapped ice creams into the packing container 20. The gripper can pick up such rejected wrapped ice creams and move in direction 212 to provide them in a separate storage location or waste bin 220. Gripper 210 may also ignore such rejected wrapped ice creams and have them moved further by conveyer 120 to a waste location or any other location for handling.

The invention has been described for wrapped ice creams, but can be employed as well for any other wrapped cold product or even any wrapped product of which the temperature differs from a temperature of the surrounding environment.

Conclusies

1. Wikkerverpaktproductkwaliteitscontrolewerkwijze omvattende
 - het verschaffen van een wikkerverpakt product (10) omvattende een
5 product (11, 12) in een wikkel;
 - het toevoeren van dat wikkerverpakt product naar een meetachtergrond (120, 130) in een invangbereik (110b, 111b) van een infraroodgevoelige afbeeldingsinrichting (110, 111), welk product (11, 12) een producttemperatuur (TP) heeft die verschilt van een meetachtergrondtemperatuur (TM) van de
10 meetachtergrond (120, 121, 130), welke wikkel een wikkelttemperatuur (TW) heeft;
 - het invangen met de infraroodgevoelige afbeeldingsinrichting (110, 111) van infraroodstraling van het wikkerverpakt product (10) en de meetachtergrond;
 - het verschaffen van een beeld (15, 16) van het product (11, 12) en/of van het wikkerverpakt product (10) vanuit de infraroodstraling ingevangen met de
15 infraroodgevoelige afbeeldingsinrichting; en
 - het analyseren van het beeld voor kwaliteitscontrole van het wikkerverpakt product (10).

2. Werkwijze volgens conclusie 1, waarbij het wikkerverpakt
20 product (10) wordt toegevoerd op een transporteur (120), welke transporteur de meetachtergrond verschaft.

3. Werkwijze volgens conclusie 1 of 2, waarbij het wikkerverpakt
25 product (10) wordt toegevoerd door een transporteur over een meetoppervlak (130) met een temperatuur die verschilt van de producttemperatuur (TP) en verschilt van een temperatuur van de transporteur (120), welke meetoppervlak de meetachtergrond verschaft.

4. Werkwijze volgens een van de voorgaande conclusies, waarbij de
30 stap van het toevoeren van het wikkerverpakt product (10) wordt uitgevoerd kort nadat het product is verpakt in de wikkel (13) zodat de wikkelttemperatuur (TW) verschilt van de producttemperatuur (TP).

5. Werkwijze volgens een van de voorgaande conclusies, waarbij de stap van het verschaffen van een beeld (16,17) omvat
- het opdelen van een gebied (110b, 111b) ingevangen door de infraroodgevoelige afbeeldingsinrichting (110, 111) in een tweedimensionale matrix van pixels (17);
 - het toekennen van een pixeltemperatuur aan elke pixel (17) gebaseerd op een gemeten verdeling van infraroodstraling die is geassocieerd met die pixel;
 - het selecteren van een drempeltemperatuur (TT) tussen de producttemperatuur (TP) en de wikkelttemperatuur (TW) of tussen de wikkelttemperatuur (TW) en de meetachtergrondtemperatuur (TM), welke producttemperatuur (TM) ligt in een producttemperatuurbereik (PTR) dat aan een uiteinde wordt begrensd door de drempeltemperatuur (TT);
 - het selecteren van pixels (17) met een geassocieerde pixeltemperatuur in het producttemperatuurbereik (PTR); en
 - het opbouwen van het beeld (15, 16) uit de geselecteerde pixels (17).
6. Werkwijze volgens een van de voorgaande conclusies, waarbij de stap van het analyseren omvat het vergelijken van het beeld (15, 16) met een referentiebeeld (15a, 16a).
7. Wikkilverpaktproductinpakwerkwijze voor het inpakken van een wikkilverpakt product (10) in een pakhouder (20), welke werkwijze omvat
- de wikkilverpaktproductkwaliteitscontrolewerkwijze volgens een van de voorgaande conclusies;
 - het inpakken van het wikkilverpakt product (10) in de pakhouder (20) wanneer het wikkilverpakt product de kwaliteitscontrole is gepasseerd; en
 - het afwijzen van het wikkilverpakt product (10) wanneer het wikkilverpakt product (10) de kwaliteitscontrole niet passeert.
8. Werkwijze volgens conclusie 7, waarbij de stap van het afwijzen van het wikkilverpakt product (10) omvat het verwijderen van het wikkilverpakt product.

9. Werkwijze volgens conclusie 7 of 8, waarbij de stap van het inpakken van het wikkelpak product (10) omvat het gebruik van een grijperinrichting (210) voor het oppakken van het wikkelpak product en het verschaffen van het wikkelpak product in de pakhouder (20).

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10. Werkwijze volgens een van de voorgaande conclusies 7 tot 9, waarbij de stap van het inpakken van het wikkelpak product (10) omvat het localiseren van het wikkelpak product gebruik makende van de infraroodgevoelige afbeeldingsinrichting (110, 111).

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11. Wikkelpakproductkwaliteitscontroleinrichting (100) omvattende

- een infraroodgevoelige afbeeldingsinrichting (110, 111) geconfigureerd en aangebracht voor het invangen van infraroodstraling van een wikkelpak product (10) op een meetachtergrond (120, 130), welk product (11, 12) een

15 producttemperatuur (TP) heeft die verschilt van een meetachtergrondtemperatuur (TM) van de meetachtergrond, en welke wikkel (13) een wikkeltemperatuur (TW) heeft; en

- een computer (115) geconfigureerd en aangebracht voor het verschaffen van een beeld (15, 16) van het product (11, 12) of van het wikkelpak product (10) vanuit de infraroodstraling die is ingevangen met de infraroodgevoelige

20 afbeeldingsinrichting, en voor het analyseren van het beeld voor kwaliteitscontrole van het wikkelpak product.

12. Inrichting volgens conclusie 11, waarbij de inrichting omvat een transporteur (120) voor het toevoeren van het wikkelpak product (10), welke

25 transporteur de meetachtergrond verschaft.

13. Inrichting volgens conclusie 11 of 12, waarbij de inrichting omvat een transporteur (120) voor het toevoeren van het wikkelpak product (10), welke transporteur het wikkelpak product verschaft over een meetoppervlak (130) met een

30 temperatuur die verschilt van de producttemperatuur (TP) en verschilt van een temperatuur van de transporteur (120), welk meetoppervlak de meetachtergrond verschaft.

14. Wikkelpakproductinpakinrichting (101) voor het inpakken van wikkelpakproducten (10) in een pakhouder (20), welke inrichting omvat

- de wikkelpakproductkwaliteitscontroleinrichting (100) volgens een van de conclusies 11 tot 13;

5 - een pakstation (200) voor het inpakken in de pakhouder (20) van wikkelpakproducten (10) die de kwaliteitscontrole van de wikkelpakproductcontroleinrichting zijn gepasseerd.

15. Inrichting volgens conclusie 14, verder omvattende een
10 verwijdermechanisme voor het verwijderen van een wikkelpak product (10) dat de kwaliteitscontrole van de wikkelpakproductcontroleinrichting (100) niet is gepasseerd.

16. Inrichting volgens conclusie 14 of 15, waarbij het pakstation (200)
15 and/of het verwijdermechanisme een grijperinrichting (210) voor het oppakken van het wikkelpak product (10) omvat.

17. Inrichting volgens conclusie 16, waarbij de
wikkelpakproductinpakinrichting (101) zodanig is geconfigureerd en aangebracht
20 dat de grijperinrichting (210) het wikkelpak product (10) oppakt op basis van een positie van het wikkelpak product die is bepaald gebruik makende van de infraroodgevoelige afbeeldingsinrichting (110, 111).

18. Werkwijze of inrichting volgens een van de voorgaande conclusies,
25 waarbij het product (11, 12) een bevroren product is.

19. Werkwijze of inrichting volgens conclusie 18, waarbij het bevroren product een ijsje (11, 12) is.

30 20. Werkwijze of inrichting volgens een van de voorgaande conclusies, waarbij de wikkel een niet-metaalhoudende wikkel (13) is.

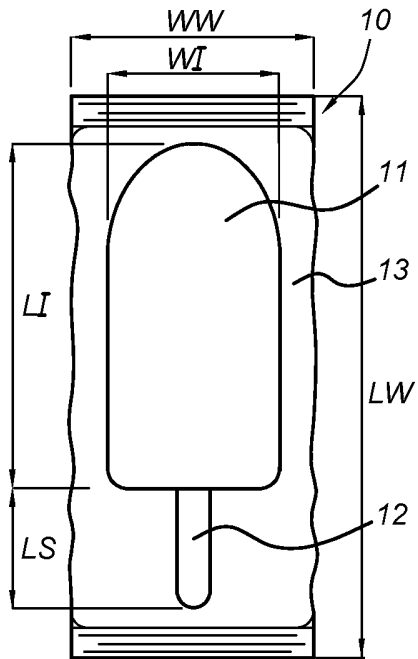
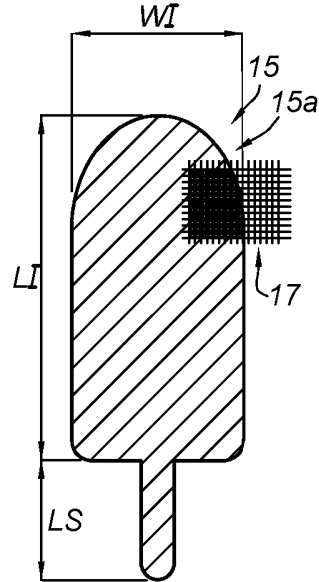
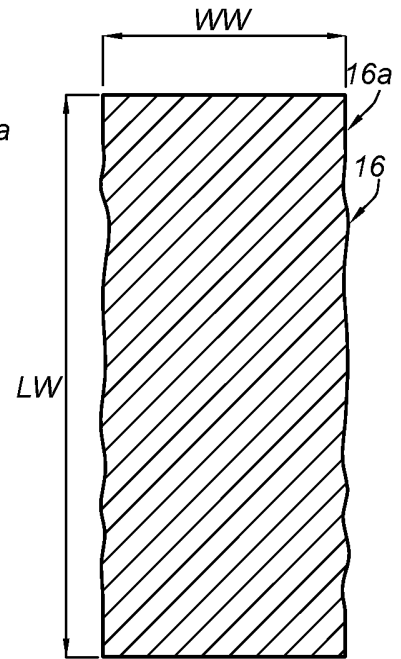
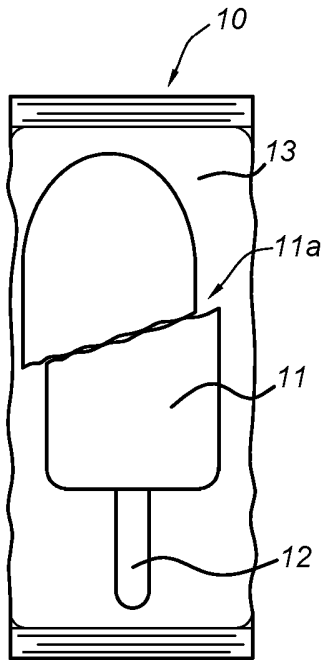
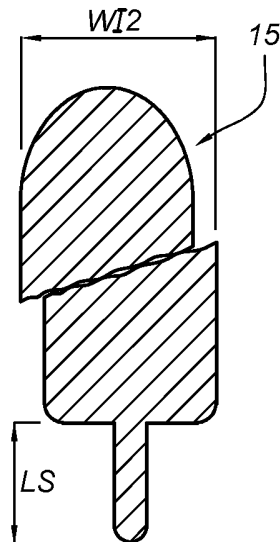
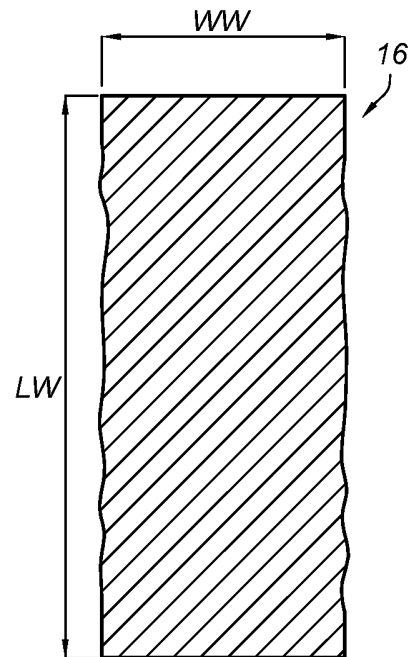
Fig. 1a*Fig. 1b**Fig. 1c**Fig. 2a**Fig. 2b**Fig. 2c*

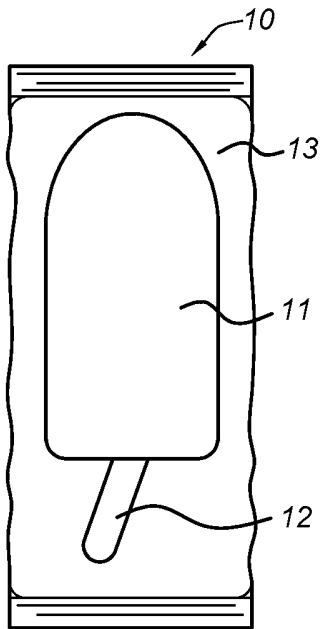
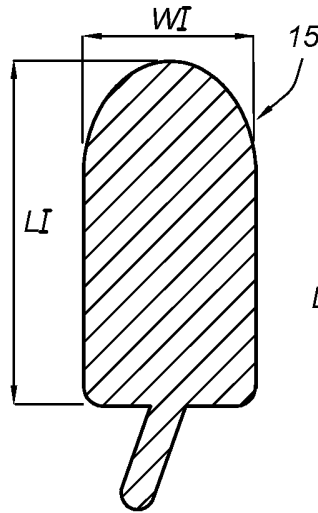
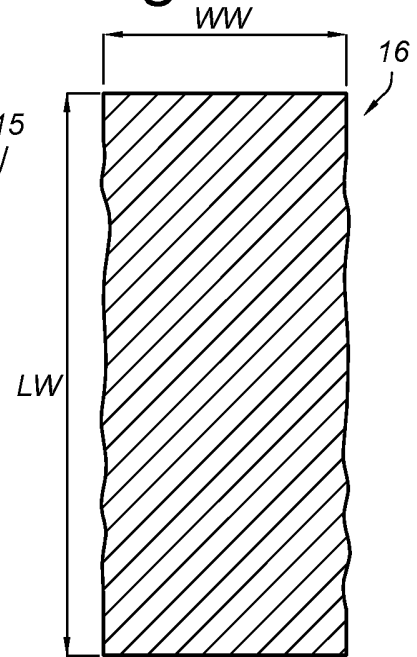
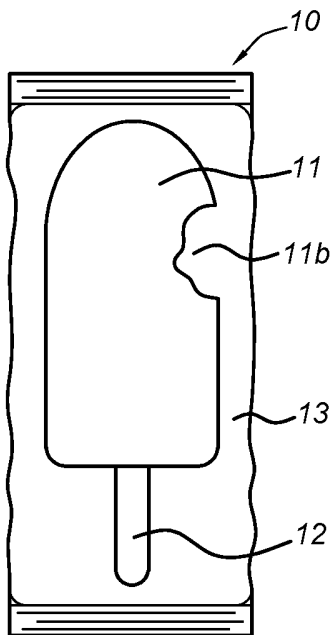
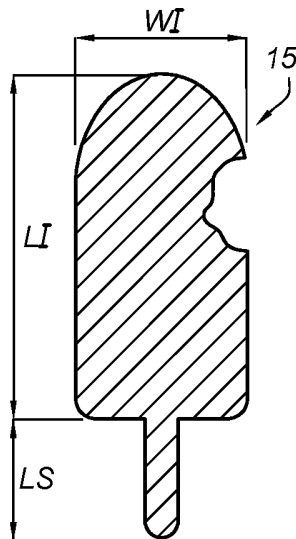
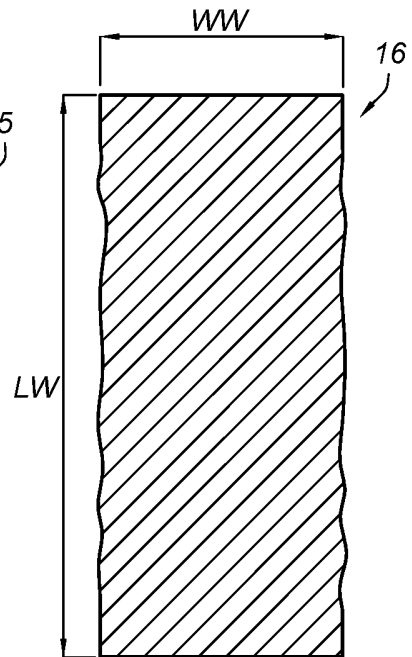
Fig. 3a*Fig. 3b**Fig. 3c**Fig. 4a**Fig. 4b**Fig. 4c*

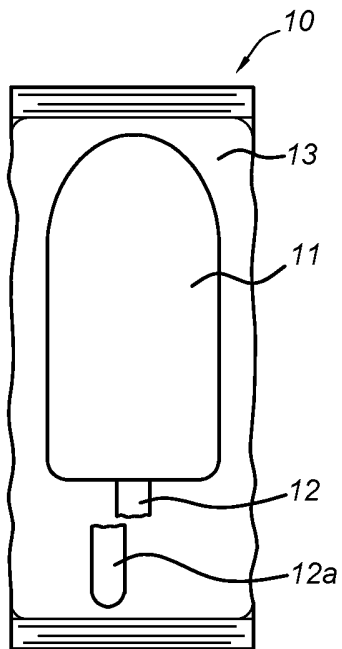
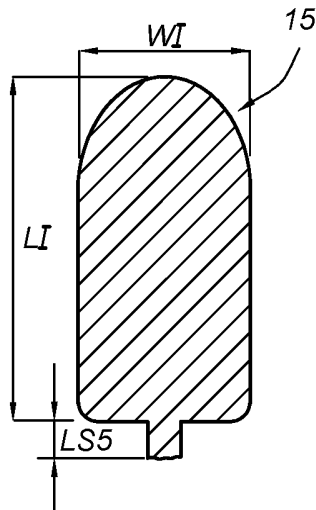
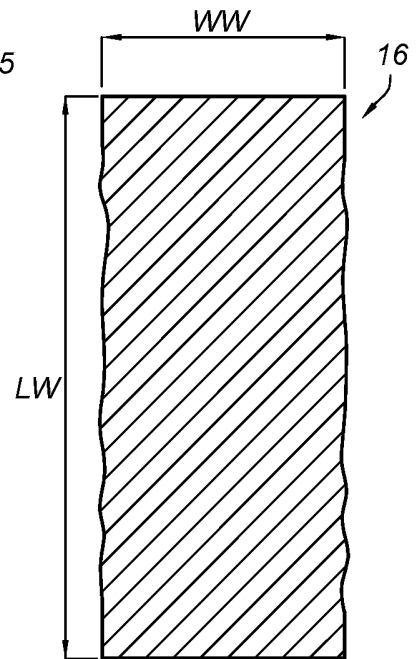
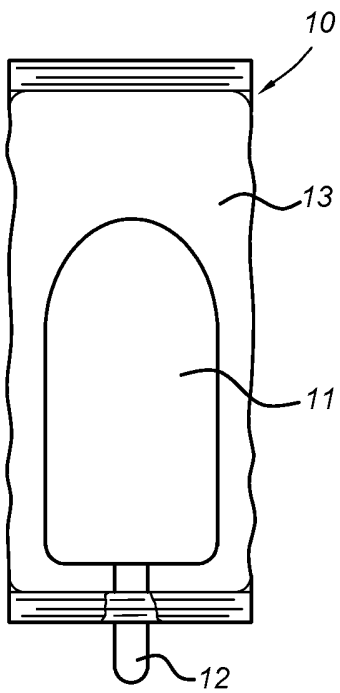
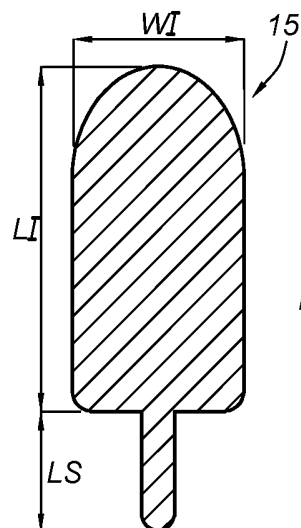
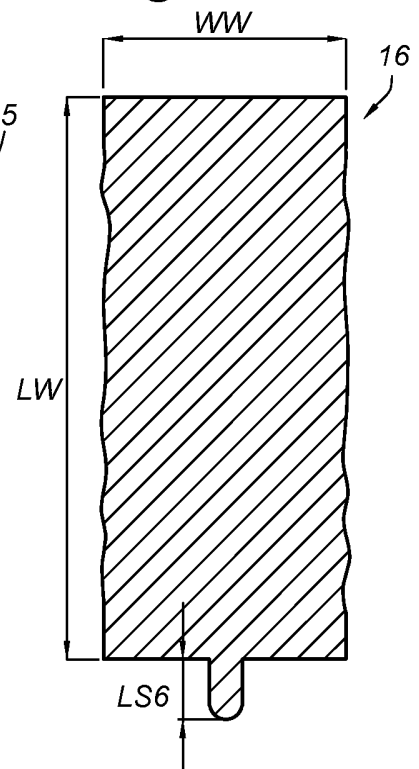
Fig. 5a*Fig. 5b**Fig. 5c**Fig. 6a**Fig. 6b**Fig. 6c*

Fig. 7

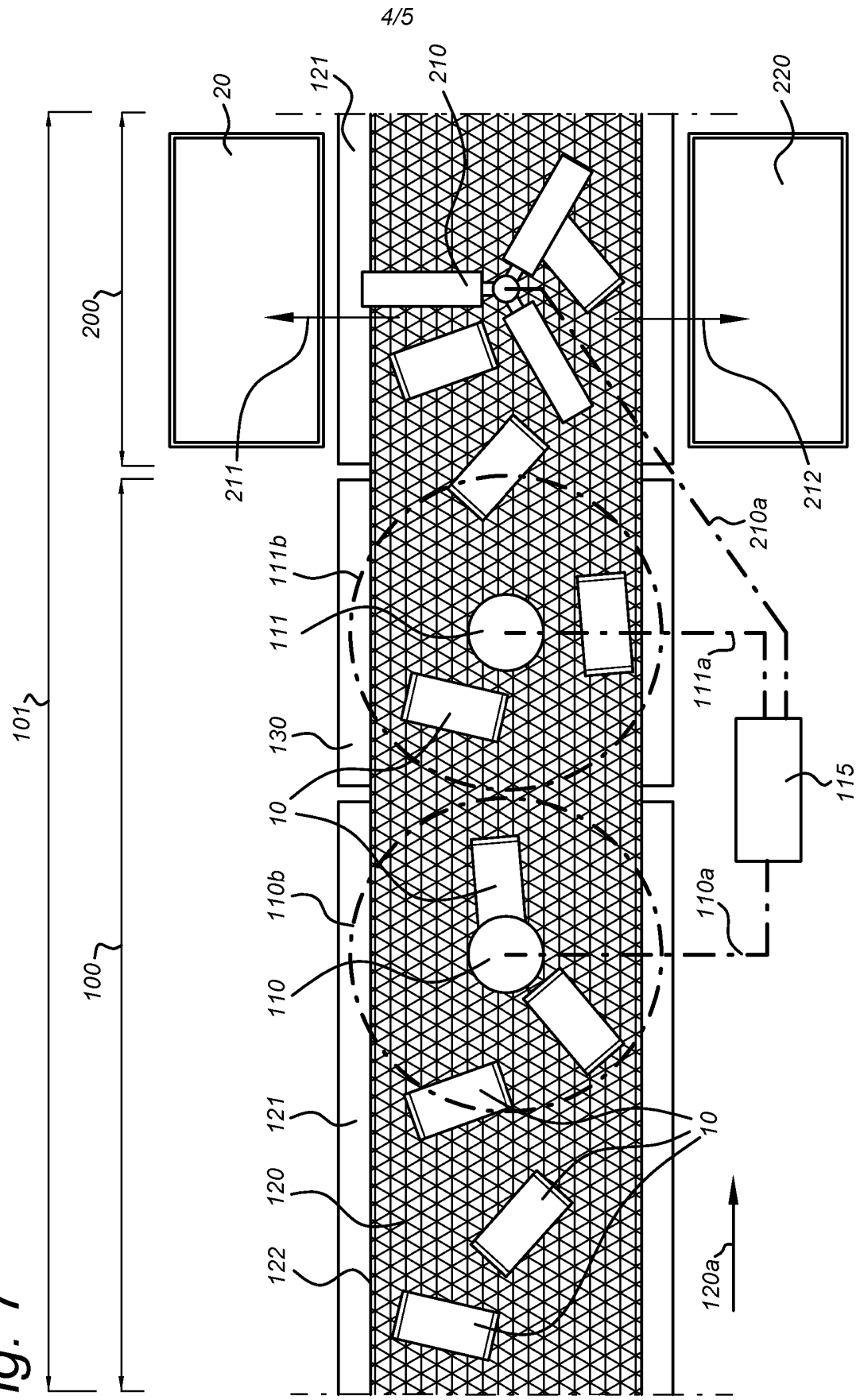
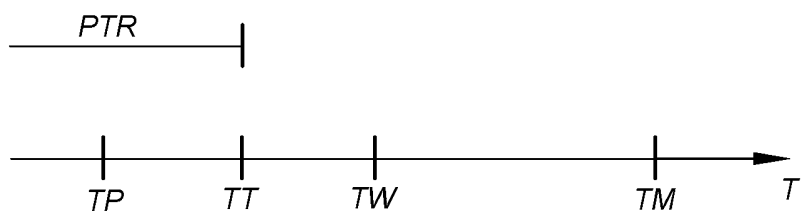
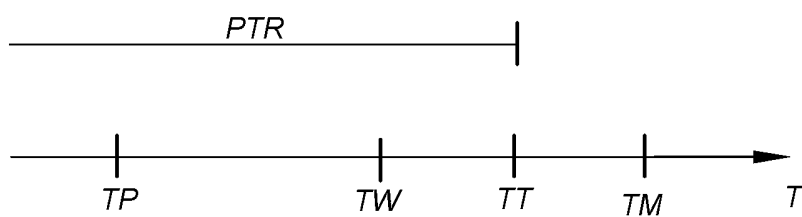


Fig. 8a*Fig. 8b*

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE P6038542NL
Nederlands aanvraag nr. 2009043	Indieningsdatum 21-06-2012
	Ingeroepen voorrangsdatum
Aanvrager (Naam) BluePrint Holding B.V.	
Datum van het verzoek voor een onderzoek van internationaal type 11-08-2012	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN58674
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC) B65B7/00;B07C5/342;G01N21/95	
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	B65B;B07C;G01N
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen	
III.	☐ GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV.	☐ GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2009043

A. CLASSIFICATIE VAN HET ONDERWERP

INV. B65B57/00 B07C5/342 G01N21/95
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
B65B B07C G01N

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	US 2010/018154 A1 (LAPERCHE CHRISTOPHE [FR]) 28 januari 2010 (2010-01-28) * samenvatting; figuren 1,2 * -----	1-20
A	US 2006/244954 A1 (DALEY WAYNE D [US] ET AL) 2 november 2006 (2006-11-02) * het gehele document * -----	1-20
A	US 7 693 331 B2 (PORIKLI FATIH M [US] ET AL) 6 april 2010 (2010-04-06) * kolom 1, regel 13 - regel 25 * -----	1,11
A	US 5 628 409 A (THOMAS DANIEL W [US]) 13 mei 1997 (1997-05-13) * samenvatting * -----	1
A	DE 42 43 206 A1 (HOEFLIGER & OEHLMANN GES ZUM B [DE]) 23 juni 1994 (1994-06-23) * samenvatting * -----	1



Verdere documenten worden vermeld in het vervolg van vak C.



Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

19 februari 2013

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Schelle, Joseph

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2009043

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 2010018154	A1	28-01-2010	EP 2080013 A1 22-07-2009 FR 2907424 A1 25-04-2008 US 2010018154 A1 28-01-2010 WO 2008047060 A1 24-04-2008
US 2006244954	A1	02-11-2006	GEEN
US 7693331	B2	06-04-2010	GEEN
US 5628409	A	13-05-1997	AU 4607896 A 21-08-1996 CA 2211169 A1 08-08-1996 DE 69518014 D1 17-08-2000 DE 69518014 T2 08-03-2001 EP 0806994 A1 19-11-1997 ES 2150601 T3 01-12-2000 FI 973177 A 31-07-1997 NO 973526 A 31-07-1997 US 5628409 A 13-05-1997 WO 9623604 A1 08-08-1996
DE 4243206	A1	23-06-1994	GEEN

WRITTEN OPINION

File No. SN58674	Filing date (<i>day/month/year</i>) 21.06.2012	Priority date (<i>day/month/year</i>)	Application No. NL2009043
International Patent Classification (IPC) INV. B65B57/00 B07C5/342 G01N21/95			
Applicant BluePrint Holding B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Schelle, Joseph
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WRITTEN OPINION

Application number

NL2009043

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	1-20
	No: Claims	
Inventive step	Yes: Claims	1-20
	No: Claims	
Industrial applicability	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following documents:
 - D1 US 2010/018154 A1 (LAPERCHE CHRISTOPHE [FR]) 28 January 2010 (2009-01-28)
 - D2 US 2006/244954 A1 (DALEY WAYNE D [US] ET AL) 2 November 2006 (2005-11-02)
 - D3 US 7 693 331 B2 (PORIKLI FATIH M [US] ET AL) 6 April 2010 (2010-04-06)
- 2 The respective subject-matter of the independent claims 1 and 11 is neither known from nor rendered obvious by the available prior art.

The documents cited in the search report (see in particular the documents D1, D2 and D3) disclose background art which does not affect the patentability of the said subject-matters.
- 3 The claims 2 to 10 and 12 to 20 are dependent and as such also meet the criteria of patentability.