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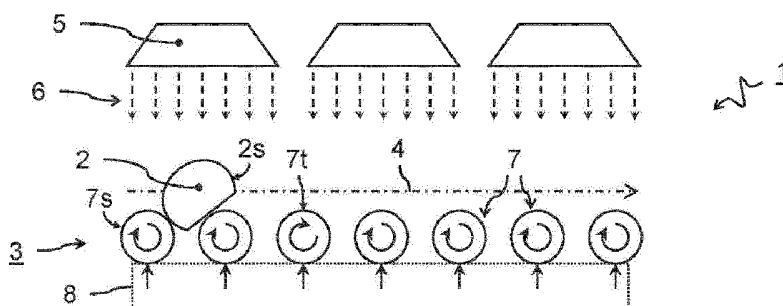
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(54) **Apparatus and method for baking and/or drying a product.**

(57) The present disclosure concerns an apparatus (1), modular part (4b), and method for baking a product (2). The apparatus (1) comprises a transporter (3) and an infrared radiator (5) arranged above the transporter. The transporter (3) comprises a plurality of rollers (7) arranged along a trajectory (4), and a rotation mechanism (8) arranged for rotating the rollers (7). The rollers (7) are arranged for, in use, contacting an outer surface (2s) of the product (2) with a rotating outer surface (7s) of the rollers (7). By said contacting and rotating outer surface (7s), the rollers (7) transfer a rotational motion to the product (2) while the product (2) is being translated along the trajectory (4). In this way different sides of the product (2) can be irradiated with infrared radiation (6) from the radiator (5).



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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.

Title: APPARATUS AND METHOD FOR BAKING AND/OR DRYING
A PRODUCT

TECHNICAL FIELD AND BACKGROUND

5 The present disclosure relates to an apparatus, modular part, and method for baking and/or drying of a product.

 It is observed that in this context, “baking” should be understood to mean the at least partial browning and/or cooking of a product. For example, in the food industry, there is an interest for edible products which
10 are ready to be consumed by a consumer or which require only a short preparation time for consumption. Examples thereof include pastas or pieces of meat which are completely or partially pre-baked and which can be prepared by a consumer by heating briefly, for instance by heating in a microwave oven. There are also products that do not require any further
15 heating by a consumer, but for which it is desired to improve an appearance of the product with a browned or seared outer layer or crust, e.g. by means of a Maillard reaction. Alternatively or in addition, the product can be dried by the apparatus, e.g. a portion of water may be evaporated from the product.

20 European Patent 1,257,173 B1 describes a baking apparatus for baking edible products located on a conveying surface, travelling along a conveyor track, wherein the conveyor track is designed as an endless conveyor belt, comprising a number of electric infrared radiators arranged above the conveyor track. The effect achieved through the use of infrared
25 radiation is that an edible product can be baked contactless. Thus, the use of oil can be minimized or even be omitted completely, while the product obtains an appealing appearance all the same. The supply of radiation can be controlled so that radiation is supplied only when needed, which enables energy saving. Further, the degree of cooking of a product can be properly

predicted. The infrared radiator typically directs infrared radiation from the radiator towards the conveyor track. Unfortunately, this may cause an uneven baking of the product. This problem may be solved by placing a plurality of radiators to irradiate the product from different sides. Also, a
5 flip mechanism may be installed to turn products, in particular substantially flat products, upside down to also irradiate the other side of the product. However, there still may be a side of the product that has not been subject to radiation and/or not all sides may be subject to radiation evenly. This uneven radiation is in particular a problem with substantially
10 round or cylindrical products, since, typically, substantially round or cylindrical products are difficult to flip.

There is a desire to provide an improved apparatus for baking and/or drying a product that obviates the above mentioned drawback, while maintaining the advantage of baking and/or drying with infrared radiation.
15

SUMMARY

A first aspect of the present disclosure provides an apparatus for baking and/or drying a product, the apparatus comprising a transporter arranged for transporting the product along a trajectory through the
20 apparatus; an infrared radiator arranged above the trajectory for directing infrared radiation from the radiator towards the trajectory for irradiating the product with the infrared radiation; wherein the transporter comprises a plurality of rollers arranged along the trajectory, and a rotation mechanism arranged for rotating the rollers; wherein the rollers are
25 arranged for, in use, contacting an outer surface of the product with a rotating outer surface of the rollers for transferring, by said contacting and rotating outer surface of the rollers, a rotational motion to the product while the product is being translated along the trajectory for irradiating different sides of the product with the infrared radiation.

The rollers can provide an effective means for rotating the product while the product is being transported along the trajectory. In this way the product can be irradiated from different sides of the product with the infrared radiation. This can prevent uneven baking of the product thus
5 providing an improved apparatus. The rollers are being driven by the rotation mechanism for being rotated.

Advantageously, the rollers are translated along the trajectory while being rotated, thereby a staying time of the product can be better regulated. Optionally, by keeping the product rotating between a pair of
10 rollers of a first roller and a second roller adjacent each other, while carrying the product along the trajectory, a baking time and homogenous exposure of the product can be improved.

A second aspect of the present disclosure provides a modular part for use in an apparatus for baking and/or drying a product, the modular part
15 comprising a transporter arranged for transporting the product along a trajectory through the modular part; an infrared radiator arranged above the trajectory for directing infrared radiation from the radiator towards the trajectory for irradiating the product with the infrared radiation; wherein the transporter comprises a plurality of rollers arranged along the
20 trajectory, optionally, a translation mechanism arranged for translating the rollers along the trajectory, and a rotation mechanism arranged for rotating the rollers while optionally translating; wherein the rollers are arranged for, in use, contacting an outer surface of the product with a rotating outer
surface of the rollers for transferring, by said contacting and rotating outer
25 surface of the rollers, a rotational motion to the product while the product is being translated along the trajectory for irradiating different sides of the product with the infrared radiation. The modular part can be used to build an apparatus according to the first aspect and may provide similar

advantages. Furthermore, by building the apparatus from modular parts, the apparatus can be more flexibly adapted to a specific product.

A third aspect of the present disclosure provides a method for baking and/or drying a product, the method comprising translating the product along a trajectory; directing infrared radiation from an infrared radiator towards the trajectory and irradiating the product with the infrared radiation; wherein a plurality of rotating rollers are arranged along the trajectory, wherein the rollers contact an outer surface of the product with a rotating outer surface of the rollers thereby transferring, by said contacting and rotating outer surface of the rollers, a rotational motion to the product while the product is being translated along the trajectory for irradiating different sides of the product with the infrared radiation. The method can be advantageously used e.g. in an apparatus according to the first aspect or a modular part according to the second aspect and may provide similar advantages. By keeping the product rotating between a pair of rollers while translating the rollers, a more predictable baking time and exposure can be obtained.

BRIEF DESCRIPTION OF DRAWINGS

These and other features, aspects, and advantages of the apparatus, systems and methods of the present disclosure will become better understood from the following description, appended claims, and accompanying drawing wherein:

FIGs 1A – 1C show cross-sectional views of a sequence of snapshots of an apparatus for irradiating a product therein;

FIGs 2A – 2C show cross-sectional views of embodiments of transporters comprising a translation mechanism;

FIGs 3A – 3C show perspective views of embodiments of rotation mechanisms;

FIG 4 shows different schematic views of an embodiment of an apparatus according to the invention;

FIG 5 shows a schematic perspective view of an embodiment of an apparatus according to the invention;

5 FIG 6 shows an embodiment wherein the apparatus comprises a basin;

FIGs 7A and 7B show schematic cross-sectional views of products being rotated by rollers.

10 DESCRIPTION OF EMBODIMENTS

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs as read in the context of the description and drawings. It will be further
15 understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein. In some instances, detailed descriptions of well-known devices and methods may be
20 omitted so as not to obscure the description of the present systems and methods. Terminology used for describing particular embodiments is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. The term "and/or" includes any and
25 all combinations of one or more of the associated listed items. It will be understood that the terms "comprises" and/or "comprising" specify the presence of stated features but do not preclude the presence or addition of one or more other features. It will be further understood that when a particular step of a method is referred to as subsequent to another step, it

can directly follow said other step or one or more intermediate steps may be carried out before carrying out the particular step, unless specified otherwise. Likewise it will be understood that when a connection between structures or components is described, this connection may be established
5 directly or through intermediate structures or components unless specified otherwise. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. In case of conflict, the present specification, including definitions, will control.

10 The invention is described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be
15 thorough and complete, and will fully convey the scope of the invention to those skilled in the art. The description of the exemplary embodiments is intended to be read in connection with the accompanying drawings, which are to be considered part of the entire written description. In the drawings, the absolute and relative sizes of systems, components, layers, and regions
20 may be exaggerated for clarity. Embodiments may be described with reference to schematic and/or cross-section illustrations of possibly idealized embodiments and intermediate structures of the invention. In the description and drawings, like numbers refer to like elements throughout. Relative terms as well as derivatives thereof should be construed to refer to
25 the orientation as then described or as shown in the drawing under discussion. These relative terms are for convenience of description and do not require that the system be constructed or operated in a particular orientation unless stated otherwise.

FIGs 1A – 1C show a sequence of schematic snapshots of an apparatus 1 according to the invention and a product 2 therein. Typically, the product 2 is being baked and/or dried while passing through the apparatus 1. The apparatus 1 comprises a transporter 3 and an infrared radiator 5. The transporter 3 is arranged for transporting the product 2 along a trajectory 4 through the apparatus 1. The infrared radiator 5 is preferably arranged above the trajectory 4 for directing infrared radiation 6 from the radiator 5 towards the trajectory 4. This may irradiate the product 2 with the infrared radiation 6. By said irradiating the product may be at least partially baked and/or dried. The transporter 3 comprises a plurality of rollers 7 arranged along the trajectory 4. The transporter 3 further comprises a rotation mechanism 8 arranged for rotating the rollers 7. The rollers 7 are arranged for, in use, contacting an outer surface 2s of the product 2 with a rotating outer surface 7s of the rollers 7. By said contacting and rotating outer surface 7s of the rollers 7, a rotational motion may be transferred to the product 2 while the product 2 is being transported along the trajectory 4. A frictional force exerted by the rollers on the product, can induce an angular momentum of the product. By rotating the product, different sides of the product 2 can be irradiated with the infrared radiation 6. When comparing the snapshots between the figures, it can be noted that the product 2 is rotated or revolved around an axis perpendicular to the shown cross-section view, transverse to the transport direction, while the product at the same time is translated along the trajectory 4.

Alternatively, the rollers may be mounted on a sloped trajectory while each roller individually may make an upward and downward movement, in addition to the rotating movement of the rollers, similar to a crank shaft movement. Due to the alternating up and down movement of the subsequent rollers mounted on a sloped trajectory, the substantially round or cylindrical product is being rotated as well as being translated

along the trajectory. Various mechanisms are possible to rotate the rollers as well as to move them up and down, e.g. by means of a crank shaft construction, or by means of an electric motor that individually drives each roller, etc.

5 In an advantageous embodiment, translating of the product 2 is facilitated by a translation mechanism, as shown e.g. in FIGs 2A – 2C, arranged for translating the rollers 7.

 Accordingly, these figures illustrate a method for baking a substantially round and/or cylindrical product 2. The method comprises
 10 translating the product 2 along a trajectory 4. The method further comprises directing infrared radiation 6 from an infrared radiator 5 towards the trajectory 4 and irradiating the product 2 with the infrared radiation 6. In the method, a plurality of rotatable rollers 7 is arranged along the trajectory 4. According to the method, the rollers 7 contact an outer surface 2s of the
 15 product 2 with a rotating outer surface 7s of the rollers 7 thereby transferring, by said contacting and rotating outer surface 7s of the rollers 7, a rotational motion to the product 2 while the product 2 is being translated along the trajectory 4 for irradiating different sides of the product 2 with the infrared radiation 6. Preferably, the method comprises
 20 translating the rollers along the trajectory 4. The method advantageously comprises keeping the product rotating between first and second rollers 7a, 7b while carrying the product 2 along the trajectory 4.

 In the embodiment of FIGs 1A – 1C, the product 2 comprises a substantially rounded shape with a flattened side. In general, it will be
 25 recognized that an apparatus as discussed herein is particularly suitable for rotating round or substantially rounded products, e.g. meat balls or bread rolls. Also products, such as elongate sausages, having at least one substantially rounded cross-section, e.g. having a substantially rotation-symmetric axis can be suitably rotated by the presently disclosed apparatus.

For example, the elongate rounded, e.g. cylindrical products can be placed with a length axis along a length axis of the rollers and rotate around said length axis of the elongate rounded product. Also ball-shaped or ellipsoidal products may be placed onto the rollers rotating around any suitable axis, usually an axis having the most rotation symmetry. In general such products can be referred to as rotatable products.

In the shown embodiment, the radiator 5 comprises three infrared radiators shining downward onto a product 2. Also other numbers of combined or separate radiators can be used. The radiators 5 may also be placed at other angles than shown.

In one embodiment, the rotation mechanism 8 is arranged to rotate a top side 7t of the rollers 7 in a direction along the trajectory 4. The rollers can be arranged for translating the product 2 by means of the rotating top side 7t of the rollers 7 along the trajectory 4 while rotating the product 2. In this embodiment, the rollers 7 can have a fixed location while the product tumbles over the rollers 7 exposing different sides of the product 2 to the infrared radiation 6. An advantage of this embodiment can be that a relatively simple setup can be used.

The terms “baking trajectory”, “drying trajectory”, “baking and/or drying trajectory”, or simply “trajectory”, can be used herein to refer to a path that the product traverses through the apparatus, wherein the product is baked and/or dried while traversing said path. Typically, the trajectory comprises a path between an entry of the apparatus and an exit of the apparatus, e.g. through a baking and/or drying tunnel formed by a cavity in the apparatus. One or more infrared radiators 5 are arranged to irradiate the product while it traverses the trajectory 4 for baking and/or drying the product. The apparatus can be continuously operated, e.g. products can be continuously fed into an entry part, each traversing the trajectory 4 and exiting the apparatus after being baked and/or dried on the trajectory

4.FIGs 2A – 2B show embodiments of transporters 3 further comprising a translation mechanism 9 arranged for translating the rollers along the trajectory 4.

In a preferred embodiment, the rollers 7 comprise a first roller 7a
 5 and a second roller 7b arranged for carrying the product 2 in between, e.g. in a pocket formed between the first and second rollers 7a, 7b. The first and second rollers 7a, 7b are arranged to keep the product 2 rotating between the first and second rollers 7a, 7b while carrying the product 2 along the trajectory 4. In other words, preferably, the product 2 is kept between the
 10 same two rollers 7a and 7b along the trajectory 4 or at least for a substantial part of the trajectory 4. This can provide an improved control over the translating and rotating of the product 2. For example, whereas the embodiment of FIGs 1A – 1C may provide a degree of randomness wherein the product skips forwards across the rollers in a somewhat unpredictable
 15 way, the present embodiments of FIGs 2A – 2C can provide a more predictable behaviour of the product and thus the baking process. It is noted that the rollers of the present embodiments can also be rotated backwards compared to FIGs 1A – 1C, since a translating of the product 2 can be independent of the rotation. Of course a plurality of products can be held
 20 between any pair of adjacent rollers. When the rollers are more elongated than a longest cross-section axis of the product, multiple products may be held between the same pair of rollers.

In the shown embodiments, the translation mechanism comprises a belt 9, e.g. a rubber belt, metal chain, et cetera. The belt 9 is attached to
 25 the rollers 7. The belt can be directly attached to the rollers or an axle of a roller, or e.g. via other intermediate structures such as the rotation mechanism 8. The product 2 that is arranged on the rollers 7 is translated by the belt 9 and rollers along the trajectory 4.

FIG 2A shows a linear belt 9 with a rotation mechanism 8 attached on top of the belt 9. The rotation mechanism 8 can e.g. comprise a motor or any other mechanism for rotating the rollers 7, e.g. as discussed further below.

5 FIG 2B shows an endless belt 9 wherein the rollers are attached to the endless belt 9 to follow an endless path. This may facilitate continuous operation of the apparatus 1.

 In a further embodiment the linear or endless belt 9 is arranged to pass the rollers 7 via a cleaning station 10 arranged for cleaning the
10 rollers 7. It will be appreciated that using a belt in combination with a cleaning station, the rollers can be cleaned e.g. after carrying the product through the apparatus 1. This can further facilitate continuous operation of the apparatus 1, e.g. operations of the apparatus 1 does not need to be interrupted for cleaning. Preferably, a rotation and/or translation driving
15 mechanism of the rollers is arranged at end of the rollers, i.e. at an end of the rotational axis. In this way, when cleaning an inner part of the rollers contacting the product, the driving mechanism need not be affected.

 In a further embodiment, the cleaning station is arranged to clean the rollers using a wet cleaning substance 10w. As shown, the belt 9 is
20 arranged for moving the rollers 7 along the trajectory 4 on a top side 9t of the belt 9 for carrying the product 2. Subsequently the belt 9 passes the rollers via or through the cleaning station 10. Finally, the belt moves the rollers on a bottom side 9b of the belt 9 for drying the rollers of the wet cleaning substance 10w on the bottom side 9b. This cycle may then repeat
25 wherein the rollers 7 emerge again on the top side 9t of the belt 9. It will be appreciated that such an arrangement can facilitate a drying of the rollers before they come in contact again with the product.

FIG 2C shows another endless belt 9 but wherein the belt 9 is attached to respective axles of the rollers 7. In this embodiment, the belt 9 is attached to respective axles of the rollers 7.

In one embodiment, a spacing element 7m is arranged to set a
 5 spacing between the rollers 7 with an adjustable interval. For example, the belt 9 may comprise a chain with modular elements, wherein an axle of a roller is attached to a modular element of the chain. In this way the interval can be set at discrete distances. Also a continuous spacing element 7m can be used, e.g. a clamping mechanism may attach an axle of a respective roller
 10 anywhere along a length of the belt 9. The spacing element 7m is thus not limited to the present embodiment. It will be appreciated that the spacing element may facilitate adaptation of the apparatus 1 for differently sized products. To further facilitate adaptation, the spacing element can be set automatically e.g. by a controller.

15 In the embodiment of FIG 2C, the rotation mechanism 8 is formed by the rollers directly or indirectly contacting a frictional body while translating with respect thereto, e.g. as further explained with reference to FIG 3A. In general, the rotation mechanism 8 can be coupled to the translating of the rollers along the trajectory 4, e.g. using an embodiment
 20 such as FIG 3A or 3B, or decoupled using an embodiment such as FIG 3C.

For example, in the embodiments of FIGs 3A and 3B, the rotation mechanism 8 comprises mating parts arranged for engaging each other. A first mating part 7w, 7g is rotationally attached to a respective roller 7 and arranged to be translated relative to a second mating part 8f, 8r. In fact, the
 25 first mating part is rotationally fixed attached to the roller, upon rotation of the first mating part, the roller rotates as well. The relative translation thus causes a rotation of the first mating part. It is noted that the second mating parts 8f, 8r can be stationary while the second mating part 8f, 8r can be moving, or alternatively both mating parts can be moving, or alternatively,

the first mating part 7w, 7g can be stationary while the second mating part 8f, 8r can be moving, e.g. according to an embodiment of FIGs 1A – 1C. The second mating part 8f, 8r may e.g. be comprised in a second moving belt (not shown) moving in the same or opposite directions as a first belt 9 used for
 5 translating the rollers.

In an embodiment, as shown in FIG 3A, the rotation mechanism comprises a frictional body 8f wherein the rollers 7 and the frictional body 8f are arranged to be translated relative to each other with at least part 7w of the rollers 7 in contact with the frictional body 8f. The rollers 7 are driven to
 10 be rotated by said translating in contact with the frictional body 8f. For example, the rollers can be translated by a belt 9 as explained above. The frictional body can be stationary, e.g. as shown in FIG 2C. Alternatively, the frictional body comprises a second belt (not shown) arranged to be translated relative to the rollers. In this way an angular velocity of the
 15 rollers can be determined independent of the translation velocity.

In another embodiment, as shown in FIG 3B, the rotation mechanism for rotating the rollers 7 comprises a rack 8r having teeth arranged to engage corresponding teeth on gear wheels 7g that are rotationally connected to respective rollers 7. The gear wheels 7g are
 20 arranged to be translated with respect to the rack 8r while engaging the rack 8r. The rollers 7 are driven to be rotated by said translating gear wheels 7g engaging the rack 8r. This embodiment can have an advantage of further improving control over a rotation of the rollers, e.g. the teeth may prevent a slipping of the rotation mechanism compared to FIG 3A. Similar
 25 as explained above with respect to FIG 3A, the rack 8r can be stationary or e.g. comprised on a moving second belt. Preferably, the gear wheels 7g are arranged on axles of respective rollers 7. The rollers 7 and gear wheels 7g are arranged to be translated with respect to the rack 8r while the gear

wheels 7g engage the rack 8r. This may provide a relatively simple mechanism.

In yet another embodiment, as shown in FIG 3C, the rotation mechanism for rotating the rollers 7 comprises a motor 8m, e.g.

5 electromotor, arranged to rotate an axle of a roller. This embodiment may provide even better control over rotation of the rollers 7. In another or further embodiment, a motor is comprised inside a roller. Transmission can be done e.g. by induction. An advantage of having a motor inside a roller can be that the roller can go through a washing station without getting the
10 motor wet.

As indicated e.g. in FIG 3A, preferably the rotation mechanism 8 engages an end part of an axis 7c of a roller 7. In this way a central part of the roller can be free to be used for carrying the product 2. While the present figures 3A – 3C show only a single end part of the rollers 7, the
15 other end part, not shown, may optionally comprise a similar rotation mechanism. For the embodiment of FIG 3C, it may suffice to provide a motor 8m on one side only and a bearing on the other side. Similarly, a belt (not shown here) can engage the rollers 7 in one place or multiple places, e.g. on both ends of the rollers to improve stability.

20 FIG 4 shows different views of an embodiment of an apparatus according to the present disclosure. In particular there is provided, a top view 1t, a back view 1b, a side view 1s, and a front view 1f.

As is illustrated by the present embodiment, the apparatus 1 can comprise modular parts 4a, 4b, and 4c. The apparatus 1 comprises a
25 modular entry part 4a for inserting a product into the apparatus 1, and a modular exit part 4c for exiting the product 2 from the apparatus 1. The modular entry part 4a and the modular exit part 4c are arranged to be connected to a number of modular parts 4b therein between. The trajectory 4 is formed along the number of modular parts 4b connecting to each other

for varying a path length of the trajectory 4 depending on the number of modular parts. In fact, the transporter 3 may be the part that may go through the modular parts and that may connect the modular parts. It will be appreciated that providing a modular setup of the apparatus can improve possibilities for customizing the apparatus according to a specific product, e.g. for varying a baking time by varying a length of the trajectory.

Whereas, the present disclosure refers to an apparatus, part or all of the functionality can be provided by a modular part 4b of the apparatus. For example, the modular part may comprise the transporter with rollers and infrared radiator as described herein. A number of modular parts 4b can be provided wherein a product is passed from a transporter of a first modular part to a transporter of a second modular part. When keeping the product between a pair of rollers 7a, 7b while translating the rollers such as explained with reference to FIGs 2A – 2C, the product can be transferred from a first pair of rollers in a first modular part to a second pair of rollers in a connecting second modular part of the apparatus. The modular parts may also be partially integrated, e.g. sharing a common transporter. Also, a single controller can be used to control multiple modular parts.

The apparatus 1 has an entry through which products can be fed to the transporter 3. When the apparatus 1 comprises a number of modular parts, the entry is provided in the entry module 4a. Advantageously, the opening of the entry of the apparatus 1 is adjustable, preferably the height of the entry opening is adjustable. When relatively small products are fed to the apparatus 1, the height of the entry opening is decreased and when larger products are fed to the apparatus 1, the height of the entry opening is increased. Advantageously, a screen is provided that is adjustable to increase and/or decrease the height of the entry opening. The screen can be manually adjustable or can be automatically adjustable by the control unit of the apparatus, depending on the size of the products. By adjusting the

entry opening, the infrared radiation mainly remains inside the apparatus, while at the same time undesired access to the apparatus during operation is prevented, which increases the operational safety of the apparatus 1.

FIG 5 shows a perspective view of an embodiment of the
5 apparatus 1. The apparatus 1 comprises a transporter 3 arranged for transporting a product not shown here along a trajectory 4 through the apparatus 1. An infrared radiator 5 is arranged above the trajectory 4 for directing infrared radiation not shown from the radiator 5 towards the trajectory 4 for irradiating the product with the infrared radiation. The
10 plurality of rollers making up the transporter 3 are not shown here.

In the embodiment shown, the apparatus 1 comprises a controller interface 11 arranged for monitoring and setting of baking parameters such as a rotation and/or translation velocity of the rollers, and/or an infrared radiation intensity provided by the infrared radiator 5 and/or the height of
15 an entry opening. Preferably, the radiators 5 are arranged in a casing that is adjustable in height along a translation stage 5t, as shown in Fig. 5. In Fig. 5 the apparatus 1 is shown with the casing comprising the radiators 5 in an elevated position, such that the apparatus 1 is open, e.g. for maintenance. During operation of the apparatus, the casing is in a
20 downward position such that the apparatus 1 is closed.

In an embodiment, the infrared radiator comprises a plurality of emitters arranged along the trajectory. In a further embodiment, one or more of the plurality of emitters are controllable, typically the radiation intensity of the emitter is controllable along the trajectory such that an
25 intensity of infrared radiation delivered to the trajectory is controllable to provide different zones along the trajectory. By having controllable emitters along the trajectory, a baking process can be better monitored. For example a first emitter can be controlled and/or set for providing a more intense dose of infrared radiation than a second emitter. For example, a first emitter can

be set for slowly cooking a product while a second emitter can be set for searing the product. In one embodiment, a controller is arranged for independently setting a radiation intensity of different radiation zones along the trajectory. This can give a better control of the baking and/or drying
5 process.

In the following, a further specification of preferred infrared radiators is provided. Preferably, an electrical infrared radiator is used. This can provide an improved flexibility, e.g. requiring only an electrical power socket. Alternatively or in addition other infrared radiators can be used, e.g.
10 gas powered infrared radiators, ceramic burners, and/or metallic fiber membrane (MFB) burners. Preferably, a directed infrared radiator is used, i.e. wherein the infrared radiation can be predominantly directed towards the trajectory to maximize efficiency of the used infrared radiation. The directing can be aided e.g. by a reflecting surface. In this way e.g. also a
15 non-directional infrared source can be used.

Preferably, infrared radiators of the so-called short-wave type or the so-called fast medium-wave type are used. Such infrared radiators are characterized by a relatively short heating-up time during switching on and a relatively short cooling down time during switching off. Depending on the
20 type of infrared radiator, the heating-up time can vary from less than 15 seconds to even less than 1 second.

An infrared radiator of the short-wave type has a shorter heating-up time and a higher end temperature of the spiral filament than a radiator of the fast medium wave type. During heating up, the temperature of the
25 spiral filament of an infrared radiator of the fast medium wave type rises from, for instance, less than 100° C to a maximum of about 1500-1700° C in about 4 seconds. With an infrared radiator of the short-wave type, the maximum temperature of about 1900-2100° C is, for instance, realized within 1 second.

For an infrared radiator of the fast medium wave type, the maximum intensity of the infrared radiation Can lie in the short or medium wave range, i.e. between 1.4 and 2.5 μm . For a short-wave radiator, this lies in the short-wave infrared range, i.e. radiation of a wavelength between
 5 about 0.9 and 1.6 μm , in particular about 1.4 μm .

Depending on the type of product and the desired treatment, a particular type of infrared radiator can be selected or a combination of the radiator types can be made. E.g. advantageous infrared radiators of the fast medium-wave type are infrared radiators of the 1400 series marketed by the
 10 firm Heraeus. E.g. advantageous infrared radiators of the short-wave type are the infrared radiators of the 1700 series of the firm Heraeus. Other types of infrared radiators may also be used. Typically, the infrared radiators have a casing of quartz glass and a reflector layer applied by vaporization, so that the infrared radiation can be bundled in the direction
 15 of the trajectory.

FIG 6 shows an embodiment, wherein the apparatus 1 further comprises a basin 12 below the rollers 7. The basin 12 is arranged for holding a fluid 12f for capturing parts 2p, e.g. debris, falling off of the
 20 product 2 between the rollers 7. This embodiment can alleviate build-up of debris falling between the rollers 7. For example, the basin can be connected to a water supply (not shown here) for feeding water as fluid 12f into the basin 12. Optionally, also a cleaning solution can be provided in the fluid 12f. In one embodiment, the fluid 12f can be flushed through the basin 12 as
 25 a stream to flush away the particles 2p

Advantageously, the fluid 12f can be arranged for absorbing and/or carrying away excess heat caused by part 6p of the infrared radiation 6 falling between the rollers 7. This can be advantageous in preventing overheating of the apparatus 1. The heat can be absorbed and carried away

e.g. by hooking the apparatus 1 up to a water supply, wherein water of a certain temperature is continuously provided to the apparatus 1. This water can heat up by absorption of the infrared radiation 6 radiating between the rollers 7. The heated water or other fluid can be drained out of the apparatus 1. At the same time also debris falling from the product 2 can be drained with the water. Alternatively a closed circuit can be used wherein the heated water is cooled down before re-entering the apparatus 1. For example a filter can be used in such a recycled stream to filter debris 2p falling from the product 2 in the water.

FIGs 7A and 7B illustrate arrangements of the rollers 7 in relation to the product 2. In FIG 7A, a product having a more ellipsoidal cross-section is shown, while in FIG 7B the product has a more circular cross-section. In a preferred embodiment, the rollers 7 comprise a first roller 7a and a second roller 7b arranged for carrying the product 2 in between wherein the first and second rollers 7a, 7b are arranged to keep the product 2 rotating between the first and second rollers 7a, 7b while carrying the product 2 along the trajectory. It is thus desired that the product 2 stays between the same pair of rollers 7a and 7b while rotating.

Without being bound by theory, it is observed that this condition can be achieved by setting parameters of the rollers 7 in relation to the product. For example, parameters of the rollers 7 may include a diameter 7d of the rollers, a distance 7x between the rollers, an angular velocity 7v of the rollers, a friction coefficient or roughness of a surface 7s of the rollers, et cetera. Optionally a roughness of the rollers can be adjusted, e.g. by coating the surface 7s with a gripping structure. The parameters of the rollers can be set e.g. in relation to a shape and/or size of the product, e.g. a smallest cross-section diameter 2a and largest cross-section diameter 2b in the rotation cross-section of the products as shown. Also a roughness of a

surface 2s of the product and density of the product can play role. For example, a more dense product can have a higher moment of inertia.

Without being bound by theory, it can be observed that a stability, for keeping a product 2 between respective rollers 7a and 7b while rotating the product, can be improved by increasing a relative portion 2m of the product 2 embedded in the opening formed between the rollers 7a and 7b below a top level 7l of the rollers during rotation of the product. The top level 7l can be defined as a plane between the tops 7t and 7t' of the respective rollers 7a and 7b. Without being bound by theory, a stability of the product 2 between the rollers 7a and 7b can be modelled e.g. according to a potential energy required to lift the product from its position between the rollers over one of the tops 7t or 7t'. The deeper or lower the product sits between the rollers, the more energy may be required to dislodge the product and therefore the more stably the product can be held therein between. The relative portion 2m can be defined e.g. as a percentage of the total height 2h of the product or a percentage of a mass or volume of the product below the top level 7l.

It is noted that for irregularly shaped products, the relative portion 2m, as indicated, may vary during rotation. In that case it can be desired that the relative portion 2m below the top level 7t remains higher than a given value, e.g. percentage of the height 2h, for the whole rotation of the product 2. It will be understood that the relative portion 2m of the product 2 below the top level 7l can be increased by increasing a distance 7x between the rollers or equivalently an interval 7i of the rollers and/or decreasing a diameter 7d of the rollers 7. On the other hand, a maximum spacing 7x between the rollers 7 is preferably less than a smallest cross-section diameter 2a of the product 2 to prevent the product from escaping through the spacing between the rollers.

In one embodiment, a distance interval $7i$ and diameter $7d$ is set for a given product to keep at least a relative portion $2m$ of 10% of a height $2h$ of the product below the level $7l$ at any time during rotation, more preferably, 20% or even more than 30%. The higher this percentage, the more stable may be the positioning of the product 2 between the rollers 7a and 7b. For example, the position of product 2 of FIG 7B can be more stable than that of FIG 7A due to the relative portion $2m$ being higher for FIG 7B. Also the more regular (rounded) shape of the product 2 of FIG 7B can improve the positional stability compared to the more irregular (oval) shape of FIG 7A.

As another parameter, it can be observed that a lower angular velocity $7v$ of the rollers 7 may also improve a stability of the product staying between the rollers. For example, if the angular velocity $7v$ is very high, the product 2 may be launched from the pocket formed between the rollers 7a and 7b. On the other hand increasing an angular velocity of the rollers may increase a homogeneity of the baking process by evenly exposing different sides of the product to the radiation.

In one embodiment, the apparatus 1 comprises a controller 11. The controller can be arranged for setting an angular velocity $7v$ of the rollers for setting the angular velocity $7v$ in an angular velocity range for rotating the product e.g. to obtain a predetermined staying or exposure time of the product on the trajectory to provide for an optimally baked product. Alternatively or in addition, the controller can also be arranged for setting a distance $7x$ and/or interval $7i$ between the rollers 7. For example, the spacing element $7m$ as described above can be provided to vary the spacing between the rollers. Alternatively, the spacing element $7m$ can also be operated manually.

While example embodiments were shown, also alternative ways may be envisaged by those skilled in the art having the benefit of the present disclosure for achieving a similar function and result. E.g. elements of the transporter such as the rotational and/or translational mechanisms

5 discussed may be combined or split up into one or more alternative components. The various elements of the embodiments as discussed and shown offer certain advantages, such as providing a homogeneous baking and/or drying of the product using an infrared radiators from one side. Of course, it is to be appreciated that any one of the above embodiments or

10 processes may be combined with one or more other embodiments or processes to provide even further improvements in finding and matching designs and advantages. It is appreciated that this disclosure offers particular advantages to baking round edible products such as sausages, and in general can be applied for baking and/or drying any products,

15 including non-edible products, capable of rotating in the specified manner by means of the rotating rollers. The rotation mechanism for rotating the rollers and the translation mechanism for translating the product can be separate mechanisms, i.e. working independently, or they can be partially or wholly integrated as a single mechanism, e.g. providing rotation of the

20 rollers by means of translating the rollers, or vice versa. While preferably, the rotating rollers rotate continuously in a single direction, alternatively, also rollers rotating in a reciprocating fashion can be used. While the rollers preferably have a substantially cylindrical shape, also other shapes can be used having similar effect. The rollers may e.g. comprise a plurality of

25 rotating balls, e.g. held by individual or shared axles and bearings.

It is thus recognized that while the present systems and methods have been described in particular detail with reference to specific exemplary embodiments thereof, numerous modifications and alternative embodiments may be devised by those having ordinary skill in the art without departing

from the scope of the present disclosure. For example, embodiments wherein devices or systems are disclosed to be arranged and/or constructed for performing a specified method or function inherently disclose the method or function as such and/or in combination with other disclosed embodiments of methods or systems. Furthermore, embodiments of methods are considered to inherently disclose their implementation in respective hardware, where possible, in combination with other disclosed embodiments of methods or systems. Furthermore, methods that can be embodied as program instructions, e.g. on a non-transient computer-readable storage medium, are considered inherently disclosed as such embodiment.

Finally, the above-discussion is intended to be merely illustrative of the present systems and/or methods and should not be construed as limiting the appended claims to any particular embodiment or group of embodiments. The specification and drawings are accordingly to be regarded in an illustrative manner and are not intended to limit the scope of the appended claims. In interpreting the appended claims, it should be understood that the word "comprising" does not exclude the presence of other elements or acts than those listed in a given claim; the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements; any reference signs in the claims do not limit their scope; several "means" may be represented by the same or different item(s) or implemented structure or function; any of the disclosed devices or portions thereof may be combined together or separated into further portions unless specifically stated otherwise. The mere fact that certain measures are recited in mutually different claims does not indicate that a combination of these measures cannot be used to advantage. In particular, all working combinations of the claims are considered inherently disclosed.

CONCLUSIES

1. Inrichting (1) voor het bakken en/of drogen van een product (2), de inrichting (1) omvattende
 - een transporteur (3) ingericht voor het transporteren van het product (2) langs een traject (4) door de inrichting (1);
 - een infrarood-straler (5) ingericht boven het traject (4) voor het richten van infraroodstraling (6) van de straler (5) richting het traject (4) voor het bestralen van het product (2) met de infraroodstraling (6); waarbij
 - de transporteur (3) een veelheid rollers (7) omvat, ingericht langs het traject (4), en een rotatie-mechanisme (8) ingericht voor het roteren van de rollers (7);
 - waarbij de rollers (7) zijn ingericht voor het, in gebruik, contacteren van een buitenoppervlak (2s) van het product (2) met een roterend buitenoppervlak (7s) van de rollers (7) voor het overbrengen van een roterende beweging aan het product (2) door genoemd contacterend en roterend buitenoppervlak (7s) van de rollers (7) terwijl het product (2) getransleerd wordt langs het traject (4) voor het bestralen van verschillende zijdes van het product (2) met de infraroodstraling (6).
2. Inrichting (1) volgens conclusie 1, verder omvattende een translatie-mechanisme (9) ingericht voor het transleren van de rollers (7) langs het traject (4).
3. Inrichting (1) volgens conclusie 1 of 2, waarbij de rollers (7) een eerste roller (7a) en een tweede roller (7b) omvatten, ingericht voor het dragen van het product (2) ertussenin; waarbij de eerste en tweede rollers (7a, 7b) zijn ingericht om het product (2) roterend tussen de eerste en tweede rollers (7a, 7b) vast te houden tijdens het dragen van het product (2) langs het traject (4).
4. Inrichting volgens een der voorgaande conclusies, waarbij een rotatie-as van de rollers is georiënteerd dwars op een transportrichting.

5. Inrichting (1) volgens een der voorgaande conclusies, waarbij het rotatie-mechanisme (8) passende delen omvat, ingericht om in elkaar te grijpen, waarbij een eerste passend deel (7w, 7g) roteerbaar is bevestigd aan een respectieve roller (7) en ingericht om getransleerd te worden relatief ten opzichte van een tweede passend deel (8f, 8r); waarbij de relatieve translatie een rotatie veroorzaakt van het eerste passend deel.
6. Inrichting (1) volgens een der voorgaande conclusies, waarbij het rotatie-mechanisme een wrijvingslichaam (8f) omvat, waarbij de rollers (7) en het wrijvingslichaam (8f) zijn ingericht om getransleerd te worden relatief ten opzichte van elkaar met tenminste een deel (7w) van de rollers (7) in contact met het wrijvingslichaam (8f), waarbij de rollers (7) worden gedreven om te roteren door genoemd transleren in contact met het wrijvingslichaam (8f).
7. Inrichting (1) volgens een der voorgaande conclusies, waarbij het rotatie-mechanisme voor het roteren van de rollers (7) een rek (8r) met tanden omvat, ingericht om corresponderende tanden aan te grijpen op tandwielen (7g) die roteerbaar zijn verbonden met respectieve rollers (7) waarbij de tandwielen (7g) zijn ingericht om getransleerd te worden ten opzichte van het rek (8r) tijdens het aangrijpen van het rek (8r), waarbij de rollers (7) worden gedreven om te roteren door genoemde translerende tandwielen (7g) die aangrijpen op het rek (8r).
8. Inrichting (1) volgens een der voorgaande conclusies, waarbij het rotatie-mechanisme voor het roteren van de rollers (7) een motor (8m) omvat, ingericht om een as van een roller te roteren.
9. Inrichting (1) volgens een der voorgaande conclusies, verder omvattende een afstandselement (7m), ingericht om een afstand (7x) in te stellen tussen de rollers (7) met een verstelbaar interval.
10. Inrichting (1) volgens een der voorgaande conclusies, verder omvattende een bassin (12) onder de rollers, het bassin (12) ingericht voor

het houden van een fluïdum (12f) voor het vangen van delen (2p) die van het product (2) afvallen tussen de rollers (7).

11. Inrichting (1) volgens een der voorgaande conclusies, waarbij de inrichting een aantal modulaire delen (4b) omvat, ingericht voor het
5 verbinden met elkaar voor het variëren van een pad-lengte van het traject (4) door het aantal van verbonden modulair delen (4b) afhankelijk van het aantal modulair delen.

12. Inrichting (1) volgens conclusie 11, waarbij de inrichting (1) verder een modulair ingangsdeel (4a) omvat voor het inbrengen van het
10 product (2) in de inrichting (1), en een modulair uitgangsdeel (4c) voor het uitvoeren van het product (2) uit de inrichting (1), waarbij het modulaire ingangsdeel (4a) en het modulaire uitgangsdeel (4c) zijn ingericht om te worden verbonden met een aantal modulair delen (4b) daartussenin.

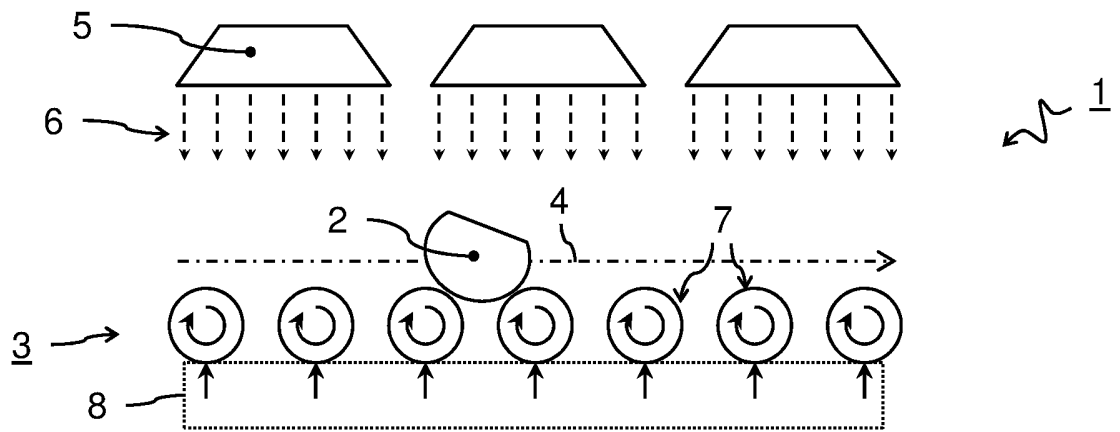
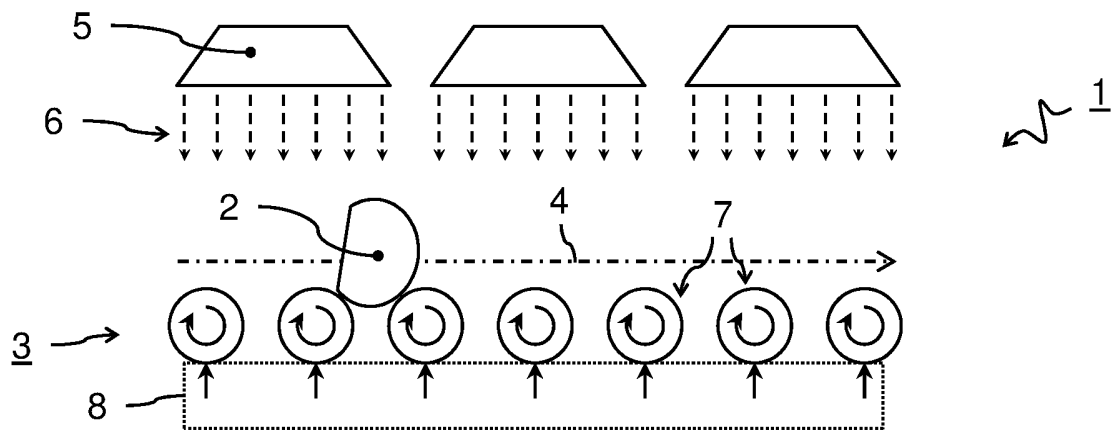
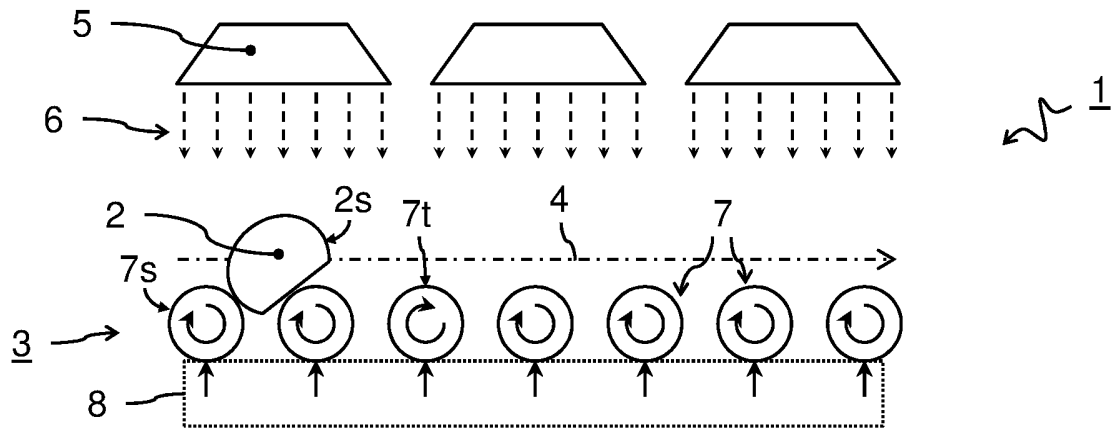
13. Inrichting (1) volgens een der voorgaande conclusies waarbij de
15 rollers (7) zijn bevestigd met een eindeloze band (9).

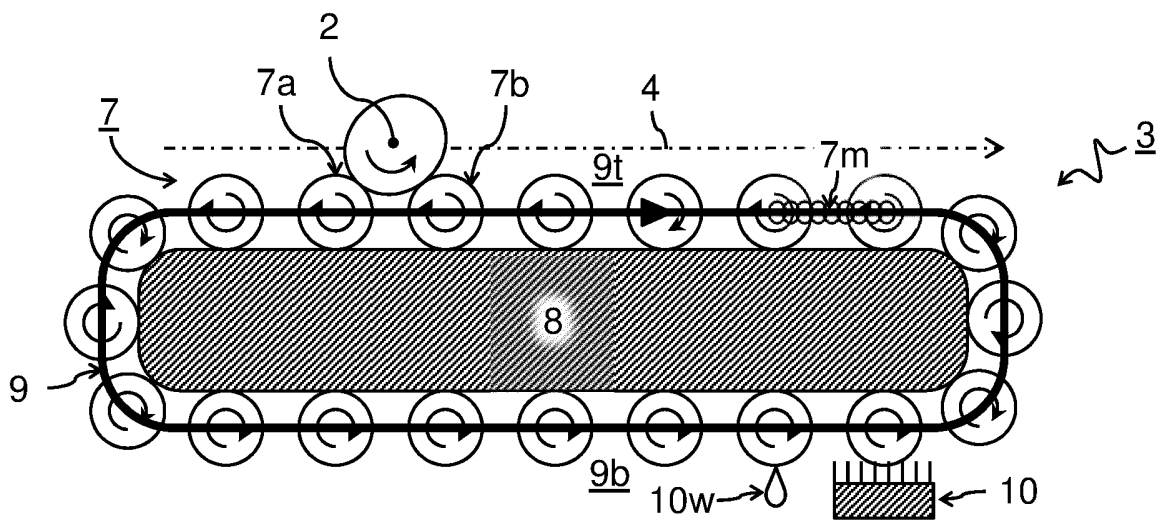
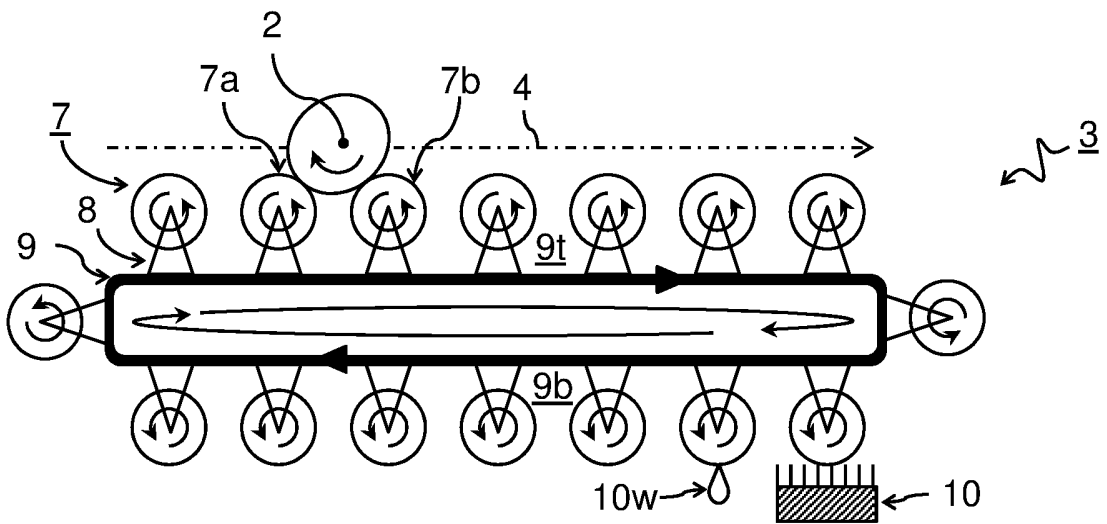
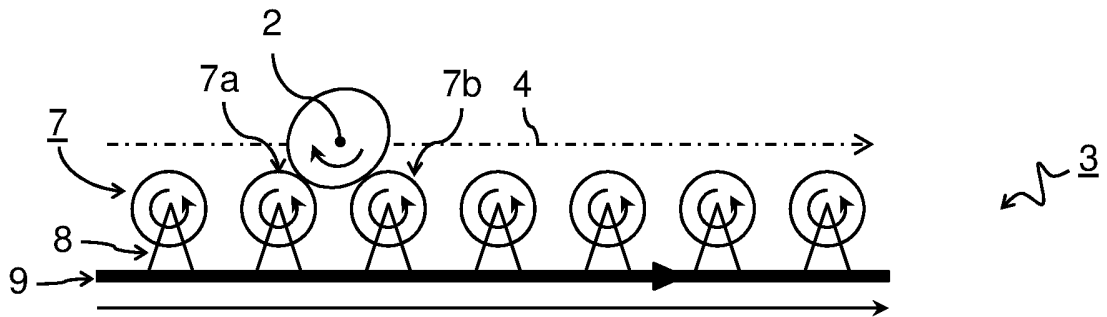
14. Inrichting volgens conclusie 12, waarbij de eindeloze band (9) is ingericht om de rollers (7) via een schoonmaakstation (10) te leiden ingericht voor het schoonmaken van de rollers (7).

15. Modulair deel (4b) voor gebruik in een inrichting (1) voor het
20 bakken en/of drogen van een product (2), het modulaire deel (4b) omvattende

- een transporteur (3) ingericht voor het transporteren van het product (2) langs een traject (4) door het modulaire deel (4b);
- een infrarood-straler (5) ingericht boven het traject (4) voor het
25 richten van infraroodstraling (6) van de straler (5) richting het traject (4) voor het bestralen van het product (2) met de infraroodstraling (6); waarbij
- de transporteur (3) een veelheid rollers (7) omvat ingericht langs het traject (4), en een rotatie-mechanisme (8) ingericht voor het roteren van de rollers (7);

- waarbij de rollers (7) zijn ingericht voor het, in gebruik, contacteren van een buitenoppervlak (2s) van het product (2) met een roterend buitenoppervlak (7s) van de rollers (7) voor het overbrengen van een roterende beweging aan het product (2) door genoemd contacterend en
- 5 roterend buitenoppervlak (7s) van de rollers (7) terwijl het product (2) getransleerd wordt langs het traject (4) voor het bestralen van verschillende zijdes van het product (2) met de infraroodstraling (6).
- 16. Modulair deel volgens conclusie 15, verder omvattende een translatie-mechanisme (9) ingericht voor het transleren van de rollers langs
- 10 het traject (4).
- 17. Werkwijze voor het bakken en/of drogen van een product (2), de werkwijze omvattende
 - het transleren het product (2) langs een traject (4);
 - het richten van infraroodstraling (6) van een infrarood-straler (5)
 - 15 richting het traject (4) en het bestralen van het product (2) met de infraroodstraling (6); waarbij
 - een veelheid roterende rollers (7) zijn ingericht langs het traject (4), waarbij
 - de rollers (7) een buitenoppervlak (2s) van het product (2)
 - 20 contacteren met een roterend buitenoppervlak (7s) van de rollers (7) daarbij een roterende beweging overbrengend aan het product (2) door genoemd contacterend en roterend buitenoppervlak (7r) van de rollers (7) terwijl het product (2) getransleerd wordt langs het traject (4) voor het bestralen van verschillende zijdes van het product (2) met de infraroodstraling (6).
 - 25 18. Werkwijze volgens conclusie 17, waarbij de werkwijze het roterend vasthouden omvat van het product (2) tussen eerste en tweede rollers (7a, 7b) van de veelheid rollers (7) tijdens het dragen van het product (2) langs het traject (4) door het transleren van de rollers (7).





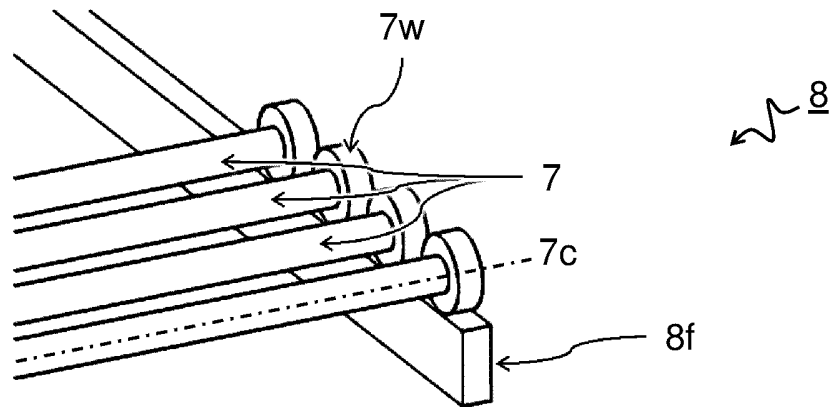


FIG 3A

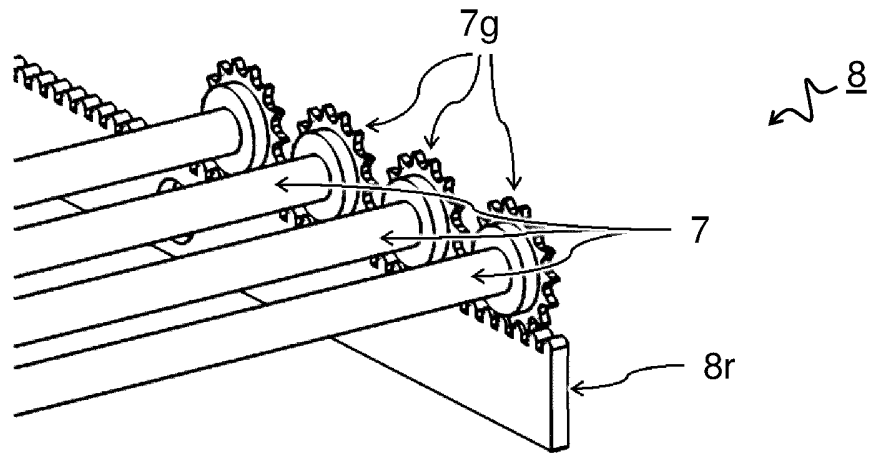


FIG 3B

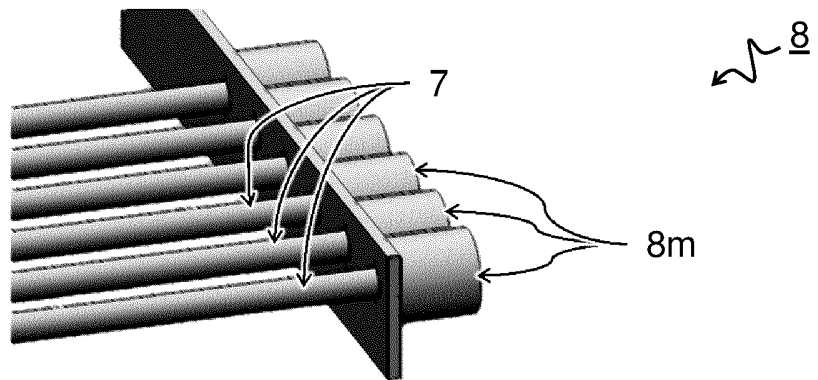


FIG 3C

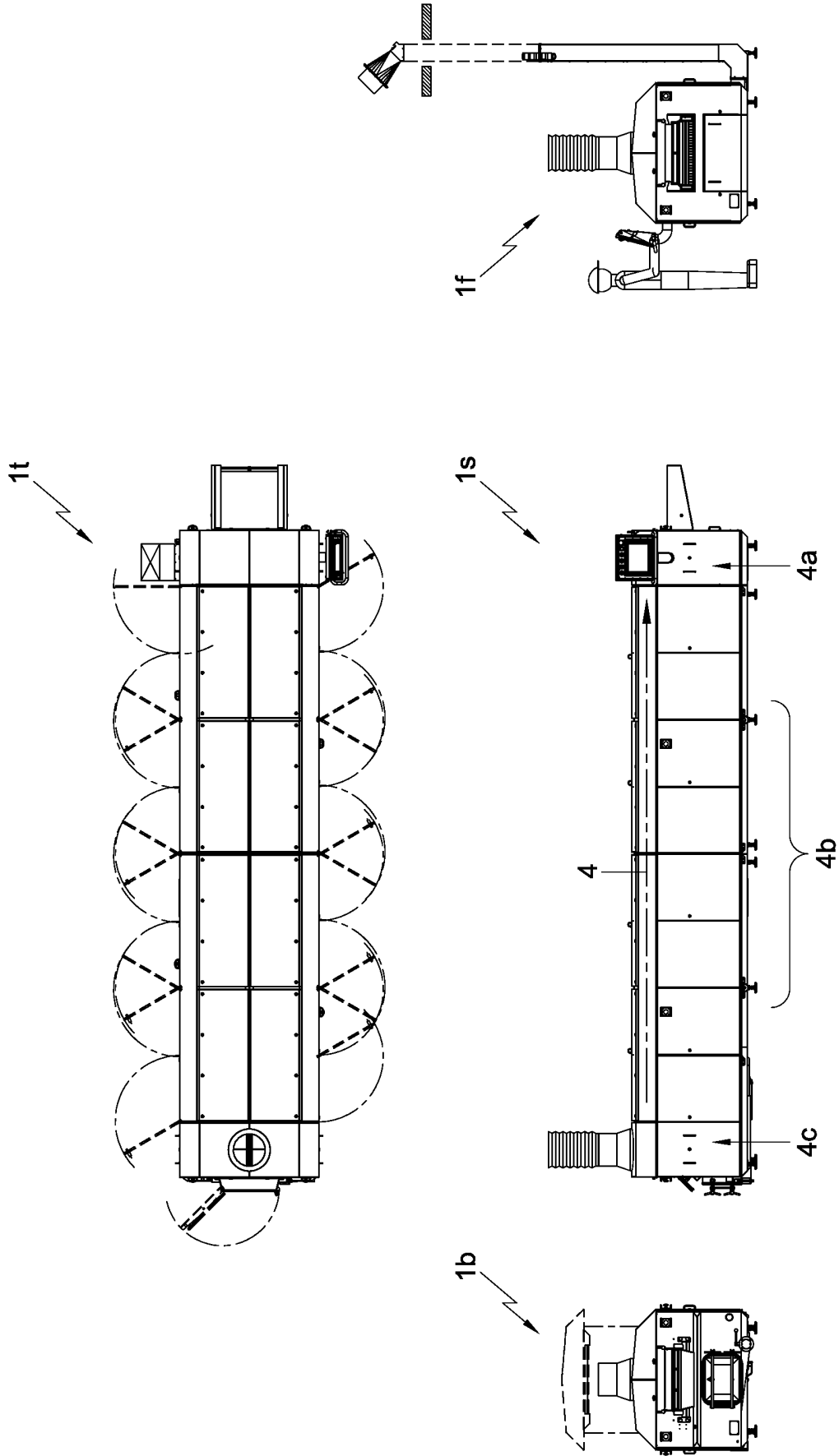


FIG 4

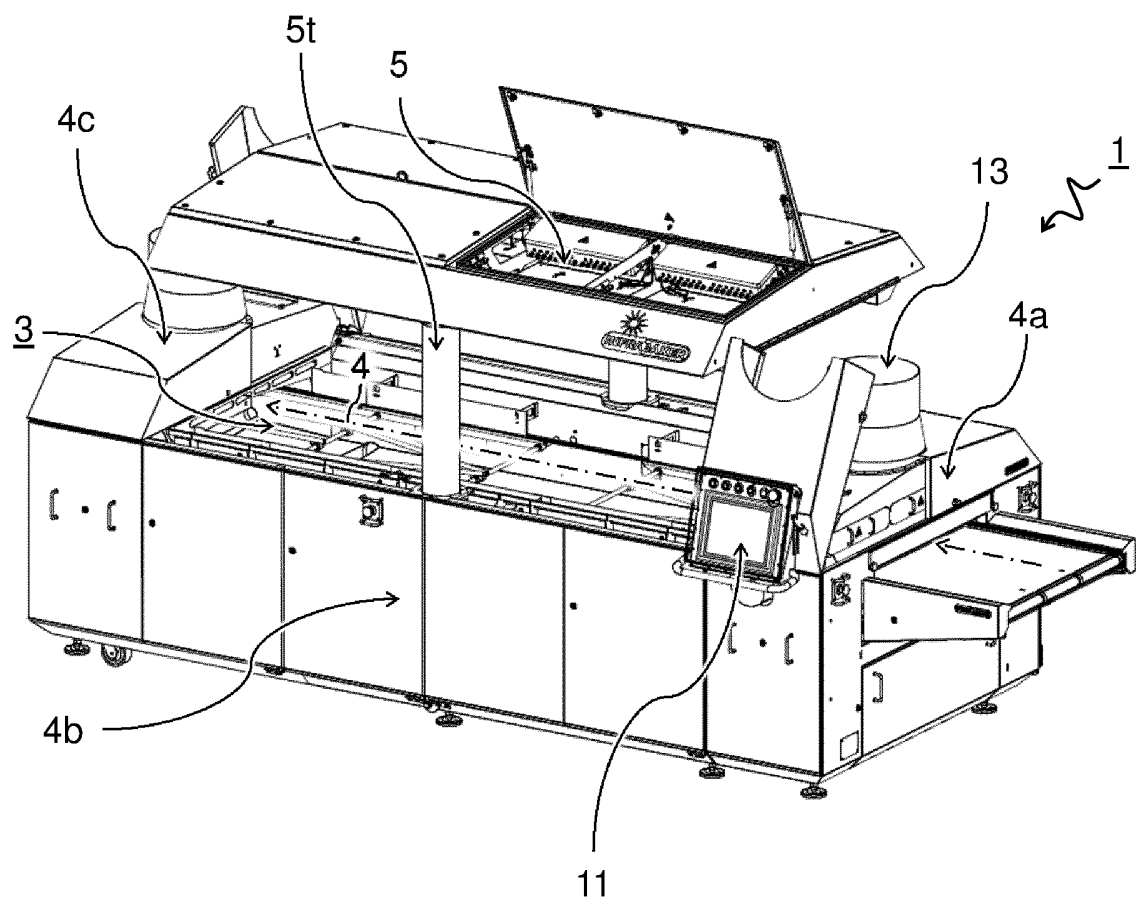


FIG 5

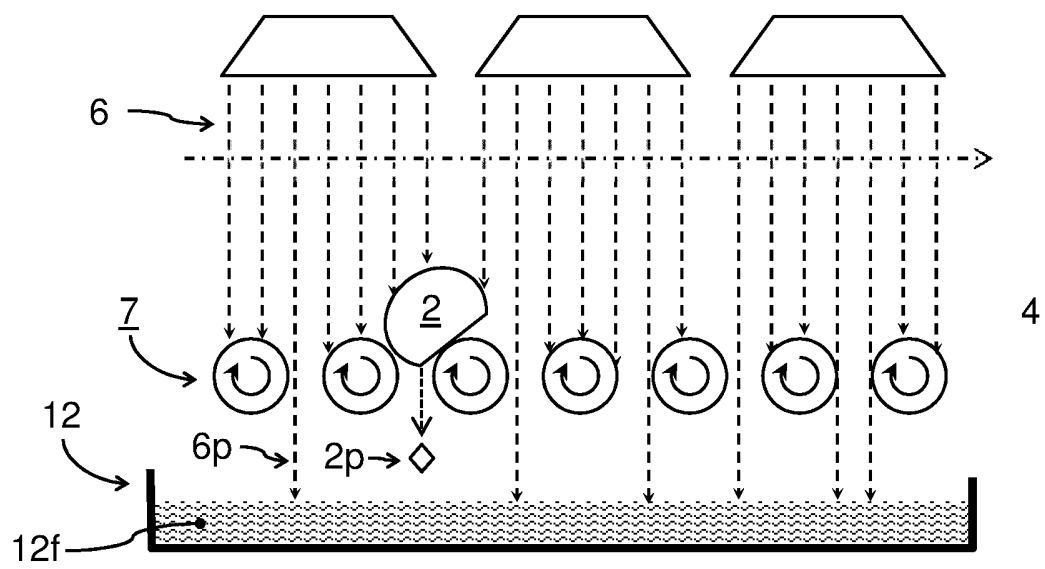


FIG 6

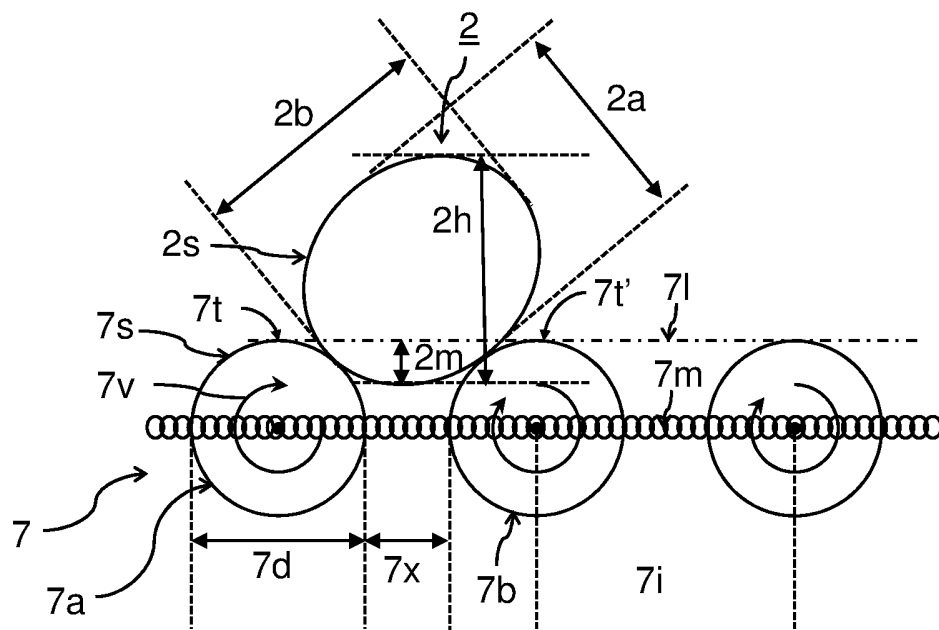


FIG 7A

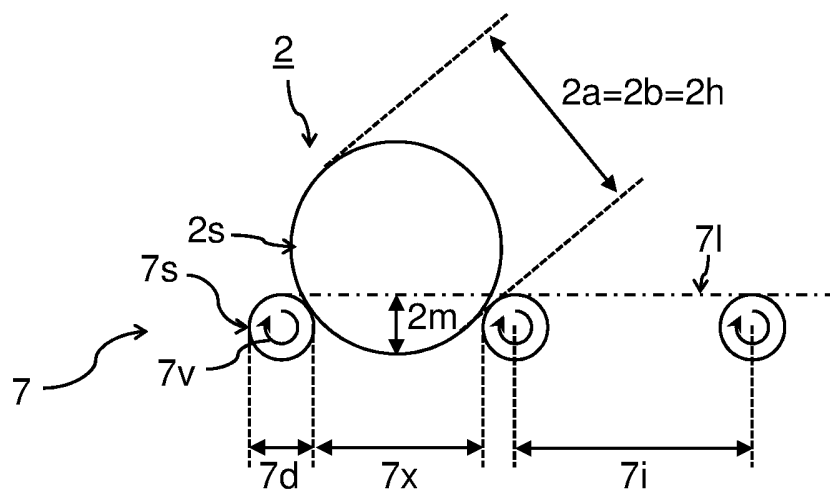


FIG 7B

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P100997NL00
Nederlands aanvraag nr.	Indieningsdatum
2010577	05-04-2013
	Ingeroepen voorrangsdatum
Aanvrager (Naam)	
Wegra Beheer B.V.	
Datum van het verzoek voor een onderzoek van internationaal type	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.
03-08-2013	SN 60474
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC)	
A21B1/42	A21B2/00
	A47J37/04
II. ONDERZOChte GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC8	A21B
	A47J
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 2010577

A. CLASSIFICATIE VAN HET ONDERWERP

INV. A21B1/42 A21B2/00 A47J37/04
ADD.

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

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
A21B A47J

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.
X	EENHEID VAN UITVINDING ONTBREEKT zie aanvullingsblad B ----- US 3 917 445 A (SUVA TITO R ET AL) 4 november 1975 (1975-11-04)	1-9, 11-13, 17,18 10
Y	* het gehele document *	
X	DE 34 20 764 A1 (ZIPPEL GUENTHER) 5 december 1985 (1985-12-05) * conclusie 12; figuren *	1-6,8, 13,14, 17,18
Y	WO 85/05545 A1 (SUNBANK FOOD EQUIPMENT INC [US]) 19 december 1985 (1985-12-19) * bladzijde 10, regel 25 - regel 27; figuur 4 *	10

☐ 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 voorrangdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangdatum 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

4 december 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

Verdoodt, Luk

AANVULLINGSBLAD B

De Instantie belast met het uitvoeren van het onderzoek naar de stand van de techniek heeft vastgesteld dat deze aanvraag meerdere uitvindingen bevat, te weten:

1. conclusies: 1-14, 17, 18

inrichting voor het bakken en/of drogen van een product,
respectievelijk een werkwijze voor het bakken en/of drogen
van een product

2. conclusies: 15, 16

modulair deel voor gebruik in een inrichting voor het bakken
en/of drogen van een product

Het vooronderzoek werd tot het eerste onderwerp beperkt.

The reasons for which the inventions are not so linked as to form a single general inventive concept, are as follows:

The prior art has been identified as US3917445 and discloses:

een inrichting (figuur 1) voor het bakken en/of drogen van een product (53), de inrichting (1) omvattende

- een transporteur (col. 2, regel 57-58) ingericht voor het transporteren van het product (53) langs een traject (50) door de inrichting (1);
- een infrarood-straler (33) (col. 3, regel 41-42) ingericht boven het traject (50) voor het richten van infraroodstraling van de straler (33) richting het traject (50) voor het bestralen van het product met de infraroodstraling; waarbij

- de transporteur een veelheid rollers (4) (col. 2, regel 59) omvat, ingericht langs het traject, en een rotatie-mechanisme (5) ingericht voor het roteren van de rollers (col. 3, regel 24-25);

- waarbij de rollers (4) zijn ingericht voor het, in gebruik, contacteren van een buitenoppervlak van het product (53) met een roterend buitenoppervlak van de rollers (4) voor het overbrengen van een roterende beweging aan het product (53) door genoemd contacterend en roterend buitenoppervlak van de rollers (4) terwijl het product (53) getransleerd wordt langs het traject (50) voor het bestralen van verschillende zijdes van het product met de infraroodstraling.

It follows that the following technical features make a contribution over the prior art and can be considered as a special technical feature:

- een afstandselment (7m), ingericht om een afstand (7x) in te stellen tussen de rollers (7) met een verstelbaar interval (to be found in claim 9);

- een modulair deel voor gebruik in een inrichting voor het bakken en/of drogen van een product (2) (to be found in claim 15).

The problems solved by these special technical features can be construed as:

- adapting the apparatus for different sized products by setting the interval between the rollers using discrete steps;

- providing a modular setup of the apparatus for customizing the apparatus according to a specific product, e.g. for varying a baking time

GEBREK AAN EENHEID VAN UITVINDING

Octrooiaanvraag Nr.:

SN 60474

NL 2010577

AANVULLINGSBLAD B

De Instantie belast met het uitvoeren van het onderzoek naar de stand van de techniek heeft vastgesteld dat deze aanvraag meerdere uitvindingen bevat, te weten:

by varying a length of the trajectory.

Neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions. Consequently, the groups of claims are not linked by common or corresponding special technical features and define 2 different inventions not linked by a single general inventive concept. The application, hence does not meet the requirements of unity of invention.

**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 2010577

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 3917445	A	04-11-1975	AT 332821 B 25-10-1976
			BE 815494 A1 25-11-1974
			CA 1018008 A1 27-09-1977
			CH 571309 A5 15-01-1976
			DE 2425296 A1 19-12-1974
			DK 283474 A 06-01-1975
			ES 426634 A1 16-07-1976
			FR 2230293 A1 20-12-1974
			GB 1437594 A 26-05-1976
			IT 1013233 B 30-03-1977
			JP S5035384 A 04-04-1975
			JP S5439520 Y2 21-11-1979
			JP S53128393 U 12-10-1978
			LU 70156 A1 09-10-1974
			NL 7406999 A 27-11-1974
			SE 407327 B 26-03-1979
			US 3917445 A 04-11-1975
DE 3420764	A1	05-12-1985	GEEN
WO 8505545	A1	19-12-1985	AU 4435285 A 31-12-1985
			EP 0182878 A1 04-06-1986
			EP 0185059 A1 25-06-1986
			WO 8505545 A1 19-12-1985
			WO 8505546 A1 19-12-1985



OCTROOICENTRUM NEDERLAND

WRITTEN OPINION

File No. SN60474	Filing date (day/month/year) 05.04.2013	Priority date (day/month/year)	Application No. NL2010577
International Patent Classification (IPC) INV. A21B1/42 A21B2/00 A47J37/04			
Applicant Wegra Beheer 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 Verdoodt, Luk
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WRITTEN OPINION

Application number
NL2010577

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:

WRITTEN OPINION

Application number

NL2010577

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable have not been examined in respect of

☐ the entire application

☒ claims Nos. 15, 16

because:

☐ the said application, or the said claims Nos. relate to the following subject matter which does not require a search (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no search report has been established for the whole application or for said claims Nos. 15, 16

☐ a meaningful opinion could not be formed as the sequence listing was either not available, or was not furnished in the international format (WIPO ST25).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; or such tables were not available in electronic form.

☐ See Supplemental Box for further details.

Box No. IV Lack of unity of invention

1. The requirement of unity of invention is not complied with for the following reasons:

see separate sheet

2. This report has been established in respect of the following parts of the application:

☐ all parts.

☒ the parts relating to claims Nos. (see Search Report)

WRITTEN OPINION

Application number
NL2010577

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	7, 9, 10, 12
	No: Claims	1-6, 8, 11, 13, 14, 17, 18
Inventive step	Yes: Claims	
	No: Claims	1-14, 17, 18
Industrial applicability	Yes: Claims	1-14, 17, 18
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item IV

Lack of unity of invention

It is considered that there are 2 inventions covered by the claims indicated as follows:

- | | |
|--------------------------|--|
| claims 1-14,17
and 18 | inrichting voor het bakken en/of drogen van een product,
respectievelijk een werkwijze voor het bakken en/of drogen van
een product; |
| claims 15-16 | modulair deel voor gebruik in een inrichting voor het bakken en/
of drogen van een product. |

The reasons for which the inventions are not so linked as to form a single general inventive concept, are as follows:

The prior art has been identified as US3917445 and discloses:

een inrichting (figuur 1) voor het bakken en/of drogen van een product (53), de inrichting (1) omvattende

- een transporteur (col. 2, regel 57-58) ingericht voor het transporteren van het product (53) langs een traject (50) door de inrichting (1);
- een infrarood-straler (33) (col. 3, regel 41-42) ingericht boven het traject (50) voor het richten van infraroodstraling van de straler (33) richting het traject (50) voor het bestralen van het product met de infraroodstraling; waarbij
- de transporteur een veelheid rollers (4) (col. 2, regel 59) omvat, ingericht langs het traject, en een rotatie-mechanisme (5) ingericht voor het roteren van de rollers (col. 3, regel 24-25);
- waarbij de rollers (4) zijn ingericht voor het, in gebruik, contacteren van een buitenoppervlak van het product (53) met een roterend buitenoppervlak van de rollers (4) voor het overbrengen van een roterende beweging aan het product (53) door genoemd contactend en roterend buitenoppervlak van de rollers (4) terwijl het product (53) getransleerd wordt langs het traject (50) voor het bestralen van verschillende zijdes van het product met de infraroodstraling.

It follows that the following technical features make a contribution over the prior art and can be considered as a special technical feature:

- een afstandselment (7m), ingericht om een afstand (7x) in te stellen tussen de rollers (7) met een verstelbaar interval (to be found in claim 9);
- een modulair deel voor gebruik in een inrichting voor het bakken en/of drogen van een product (2) (to be found in claim 15).

The problems solved by these special technical features can be construed as:

- adapting the apparatus for different sized products by setting the interval between the rollers using discrete steps;
- providing a modular setup of the apparatus for customizing the apparatus according to a specific product, e.g. for varying a baking time by varying a length of the trajectory.

Neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions.

Consequently, the groups of claims are not linked by common or corresponding special technical features and define 2 different inventions not linked by a single general inventive concept. The application, hence does not meet the requirements of unity of invention.

Re Item V

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

1. State of the art

Reference is made to the following documents:

- | | |
|----|--|
| D1 | US 3 917 445 A (SUVA TITO R ET AL) 4 november 1975 (1975-11-04) |
| D2 | DE 34 20 764 A1 (ZIPPEL GUENTHER) 5 december 1985 (1985-12-05) |
| D3 | WO 85/05545 A1 (SUNBANK FOOD EQUIPMENT INC [US]) 19 december 1985 (1985-12-19) |

2. Novelty

The present application does not meet the criteria of patentability, because the subject - matter of **claims 1-6, 8, 11, 13, 14, 17 and 18** is not new.

Document D1 discloses (the references in parentheses applying to this document):

een inrichting (figuur 1) voor het bakken en/of drogen van een product (53), de inrichting (1) omvattende

- een transporteur (col. 2, regel 57-58) ingericht voor het transporteren van het product (53) langs een traject (50) door de inrichting (1);
- een infrarood-straler (33) (col. 3, regel 41-42) ingericht boven het traject (50) voor het richten van infraroodstraling van de straler (33) richting het traject (50) voor het bestralen van het product met de infraroodstraling; waarbij
- de transporteur een veelheid rollers (4) (col. 2, regel 59) omvat, ingericht langs het traject, en een rotatie-mechanisme (5) ingericht voor het roteren van de rollers (col. 3, regel 24-25);
- waarbij de rollers (4) zijn ingericht voor het, in gebruik, contacteren van een buitenoppervlak van het product (53) met een roterend buitenoppervlak van de rollers (4) voor het overbrengen van een roterende beweging aan het product (53) door genoemd contacterend en roterend buitenoppervlak van de rollers (4) terwijl het product (53) getransleerd wordt langs het traject (50) voor het bestralen van verschillende zijdes van het product met de infraroodstraling.

Therefore all the features of **claim 1** are known. Consequently, the subject-matter of said claim is not new. The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding **independent claim 17**, which therefore is also not new.

The subject-matter of claims 1 and 17 is also known from **document D2**.

Dependent claims

In addition, D1 discloses a device according to dependent claims 2-6, 11 and 13 and a method according to claim 18. Furthermore, D2 discloses an apparatus having a cleaning station according to claim 14. The subject-matter of said claims is therefore not new.

Remark concerning claim 11: the rollers (4) of D1 are considered as modular elements connecting to each other for varying a path length of the trajectory 50 depending on the number of modular parts used

3. Inventive step

Dependent claims 7, 9, 10 and 12 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step, the reasons being as follows:

- the feature of claim 7 is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to drive the rollers;
- the additional feature of a reservoir to collect grease or product falling of the conveying means has already been employed for the same purpose in a similar device, see **document D3** (figure 4, drip pan 98). It would therefore be obvious to the person skilled in the art to apply this feature with corresponding effect to a device according to D1, thus arriving at a device according to claim 10;
- in claims 9 and 12 slight constructional changes are defined which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen.

The subject-matter of **dependent claims 7, 9, 10 and 12** does therefore not involve an inventive step.

4. Industrial applicability

The subject-matter of **claims 1-14, 17 and 18** is deemed to be industrially applicable.