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(54) **Apparatus for thermally processing food packages comprising product carriers with positive package handling.**

(57) An apparatus for thermally processing food products in sealed packages comprises heating/cooling chambers with an endless conveyor guided through them with product carriers connected thereto. Each product carrier 10 comprises insertion spaces 17 for packages 27 to be placed in. A side wall 11 of the carrier 10 comprises slits 20 which open out towards insertion openings of the respective insertion spaces 17. Operating members are provided which comprise load bearing organs 32 with operable holding means 33 for picking up and carrying packages 27. The load bearing organs 32 are movable in an insertion direction x while projecting through the slits 20 during placing of packages 27 into the insertion spaces 17.

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Title: Apparatus for thermally processing food packages comprising product carriers with positive package handling.

The present invention relates to an apparatus for thermally processing food products that have been packaged in sealed packages, in particular flexible packages like pouches.

Thermal processing apparatus are known in many variants. Each of them are designed to perform a thermal processing, which for example can be sterilization or pasteurization, in order to obtain increased shelf stability. For thermal processing of sealed flexible food packages, batch retort systems at present are mostly used. With this the flexible packages are being laid down on large square or rectangular product trays. These trays then are stacked to cubes and these cubes are then being placed inside of a static pressure vessel where they undergo a heat treatment. A well-known disadvantage hereof is the large difference in heat treatment that the food products inside the packages in the centre of the cubes undergo compared to the ones at the outside. This potentially leads to a loss of food product quality. Furthermore those batch retort systems are inefficient because of the multiple handling involved, and because of the discontinuous use of the vessel.

It is also known to perform a continuous thermal processing of such sealed flexible food packages. This offers major advantages regarding to energy efficiency, water consumption, floor space utilization and operator efficiency. For the continuous thermal processing it is required that the flexible food packages are first placed inside product carriers that are connected to an endless conveyor. The conveyor then, at a substantially continuous speed, transports the flexible food packages through various thermal processing stages, like preheating, sterilizing and cooling. Existing technology for placing the flexible food packages in the product carriers is often done by using intermediate product trays. With this the flexible food packages are first laid down on the intermediate product trays. Then in a next step those trays are placed into the product carriers. This existing technology however is inefficient because of the dual handling involved, one for filling of the product trays, and one for putting the product trays in the product carrier. Also they are not suitable for higher capacities of for example more than 250 flexible packages per minute.

EP 0 891 781 shows a hydrostatic continuous steriliser with tower sections in which food pouches are directly placed in product carriers. An endless chain with those product carriers runs meandering through the tower sections. A first tower section comprises a heated water column for preheating the food pouches which have been placed inside the carriers. A last tower section comprises a cooled water column for cooling off the food pouches. The intermediate tower sections are filled with a high temperature damp phase for

sterilizing the food pouches. The carriers of EP 0 891 781 are specifically designed with tapering compartments for being able to place the food pouches somewhat clamped therein. This is done in order to keep them supported from two sides in order to protect them during the sterilization. The tapering compartment walls are able to take up any forces which may get exerted on inner walls of the pouches when the food products start to expand during the sterilization. Thus it is tried to protect the food pouches against plastic deformations during the sterilization.

However, a disadvantage herewith is that the placing and removing of the food pouches into and out of the product carriers leaves to be desired. In EP 0 891 781 the food pouches need to be pushed with a sliding movement into the compartments. With this pushing the food pouches may get deformed somewhat. This can lead to a damaging of the food pouches and/or to a premature blocking of the food pouches before they have reached their end positions inside the tapering compartments. Also it may lead to local accumulations of the food products which may have a negative effect on the sterilization process. Also it is disadvantageous that the food pouches during their movements into and out of the compartments get to slide over and along the compartment walls. This is particularly disadvantageous because pouches are already known to be vulnerable to physical impacts such as pinching, puncturing, scratching, etc., and because recent trends and developments are directed towards even more fragile and vulnerable pouches. For example flexible packaging technology is continuously looking for opportunities to savings in raw materials and weight by creating solutions with thinner package walls, which have the additional advantage that it makes the food pouches even more suitable for thermal processing. For the sliding movements of the food pouches into and out of the tapered compartments of EP 0 891 781 such more fragile thinner walls are however prone to lead to damages. Next to this it is disadvantageous that in EP 0 891 781 it may be somewhat difficult to remove the thermally processed food pouches from out of the tapering compartments in the product carriers. With this the pouches also may get damaged. Finally in the industry it is considered best practise to compensate the pressure build up inside a package during pasteurisation or sterilisation by applying an equal or higher external pressure and not to compensate by a mechanical limitation of the expansion. Apart from the risk of damaging the vulnerable package by mechanical limitation, also the physical contact between carrier and flexible package has a negative impact on the heat transfer properties from medium to food product of the system.

The present invention aims to overcome the above disadvantages at least partly or to provide a usable alternative. In particular the invention aims to provide a user-friendly and reliable apparatus for thermally processing food packages with which the food packages can

be positively handled during insertion into and/or removal out of a product carrier without running the risk of getting damaged and without negatively influencing the thermal processing.

This aim is achieved by an apparatus for thermally processing food products in sealed packages, in particular flexible food packages, according to claim 1. The apparatus comprises one or more heating and/or cooling chambers, an endless conveyor guided through the chambers, and a plurality of product carriers connected interspaced to the conveyor. Each carrier comprises at least a first row of insertion spaces for packages to be placed in. The insertion spaces each have an insertion opening and the first row of insertion spaces is at least partly delimited by a first side wall and an opposite second side wall. An inlet station is provided which comprises one or more first operating members which are operable to move in into and out of the insertion spaces for moving packages in an insertion direction into the insertion spaces. The insertion direction extends substantially parallel to the side walls. The conveyor is designed for transporting the carriers with packages placed in the insertion spaces thereof through the one or more heating and/or cooling chambers. The first side wall comprises at least one primary slit for each insertion space. This primary slit extends substantially in the insertion direction, and opens out towards the insertion opening of its respective insertion space. The first operating members comprise load bearing organs with operable holding means at their outer ends for picking up and carrying packages. The load bearing organs extend at least partly substantially in a transverse direction relative to the side walls, and are movable back and forth in the insertion direction through the primary slits during placing of packages into the first row of insertion spaces.

Owing to the invention it is now truly possible to positively handle and position sealed food packages into product carriers of a thermal processing apparatus in such a way that a damaging of the packages can be prevented, while at the same time efficiency of loading and unloading operations can be optimized. A high capacity of thermal processing can thus be achieved. The invention allows for handling of each food package individually all the way to its final position in the product carrier without the use of gravity, and without a need for pushing, sliding, or dropping the food packages into or out of the product carriers. Tests have shown that when used for flexible food packages, the slits leave no permanent imprint or marking on the flexible food package after thermal processing. Advantageously, the slits allow for both vertical and horizontal loading and unloading, or any desired slanted position in between.

It is possible to provide the slits in only one side wall per row of insertion spaces. Advantageously however also the opposing side wall(s) can be provided with such slits. This makes it possible to more flexibly position the inlet station and/or an outlet station alongside the conveyor, because then they can reach the insertion spaces from two sides. For

example for horizontal loading and unloading, the operating members with their holding means then can be used both from below or from above. For example for vertical loading and unloading, the operating members with their holding means then can be used both from the left or the right.

In a preferred embodiment each carrier further may comprise a second row of insertion spaces for packages to be placed in. This second row of insertion spaces then can be at least partly delimited by the second side wall and an opposite third side wall. The second side wall than may comprise at least one secondary slit for each insertion space of the second row of insertion spaces. Like the primary slit, this secondary slit then also extends substantially in the insertion direction, and opens out towards the insertion opening of the respective insertion space. The load bearing organs can now advantageously be made movable in the insertion direction while projecting through both the primary and secondary slits during placing of packages into the second row of insertion spaces. Thus the density of packages per carrier can be increased, while maintaining all the advantages of the positive handling of the packages at the inlet station. If desired the number of rows can be further enlarged. The loading process then needs to be a two step method. In a first step food packages need to be loaded into the second row of insertion spaces. In a second step food packages can then be loaded into the first row of insertion spaces.

It is possible to also equip the third side wall with slits. Again this makes it possible to more flexibly position the inlet and/or outlet stations, and reach the two rows of insertion spaces from two sides. It however also makes it possible to load food packages into the respective first and second rows at a same time, one from the side of the first side wall and the other from the side of the third side wall. The intermediate second side wall then not even needs to be provided with the secondary slits.

In a further preferred embodiment each insertion space is not only delimited by the opposing side walls but also by two opposing partition walls which connect to the side walls. Thus each carrier gets to comprise one or more rows of distinctive pocket-like insertion spaces inside which the packages can be positively placed. The pocket-like insertion spaces make it easier to maintain optimal processing conditions during the thermal processing. For example it is easier to ensure maximum exposure to process medium all around the packages placed therein. It is possible to have only one or a multiple of food packages placed inside the pocket -like insertion spaces.

Preferably the pocket-like insertion spaces are designed to optimally correspond to the food package to be processed. With this the pocket-like insertion space preferably has a substantially rectangular shape inside which the food packages fit with a slight play all around, such that they do not have to lie against both opposite side walls at the same time. This makes it possible for the process medium to flow all around the food packages and

exchange heat directly instead of indirectly via the carrier side walls. It has appeared that even with such play, sufficient physical support is given to the food package in critical areas during expansion from internal pressure build up during sterilization.

In order to further optimize the exposure to process medium a hole pattern design can be provided in the carrier walls. Particularly the compartment-like insertion spaces create a situation where the location of each package placed therein is exactly known, thus allowing for an optimized design via which the package can be brought into contact with the process medium. Preferably the carrier is made with a hole pattern in its walls. This makes it possible to further maximize the heat transfer between process medium and food product inside the package.

The load bearing organs and operable holding means can be of various types as long as they are designed for being able to positively carry the packages such that they can be placed more or less floating into the insertion space without the packages running the risk of bumping against or otherwise getting in contact with the carrier side walls. In a preferred embodiment the load bearing organs are vacuum bars and the operable holding means are suction heads. In particular for flexible food packages this has appeared to be an optimal manner of picking up and placing which is well able to adapt to all kinds of different shapes and does not damage the flexible food packages in any way. Per package one or more suction heads can be used. Typically 2 to 6 suction cups are used to pick up and manipulate a single food package.

Once being thermally processed in the heating and/or cooling chambers, the packages can be taken out of the product carriers in different ways, for example by means of gravity. Preferably, however an outlet station is provided which largely resembles the inlet station, that is to say that the outlet station can be equipped with one or more second operating members which are operable to move into and out of the insertion spaces for moving packages in the insertion direction out of the insertion spaces. The second operating members then again may comprise load bearing organs with operable holding means at their outer ends for picking up and carrying food packages, which load bearing organs extend substantially in a transverse direction relative to the side walls, and which load bearing organs are movable in the insertion direction while projecting through the primary slits during picking of packages out of the first row of insertion spaces.

The slits can have all kinds of shapes, and for example be formed by U-shaped cut-outs. The slits may have a maximum width of 50 mm, in particular about 30 mm. This prevents the food packages from sagging through the slits, whereas the load bearing organs are well able to move back and forth there through. The slits may extend over the entire height of the side walls. Preferably however they end interspaced from bottom walls which may be provided to delimit lower sides of the insertion spaces, in particular interspaced at

distances of at least 10 mm. This helps to strengthen the carriers and helps to prevent the operating members and/or the food packages to bump against the bottom wall during placing.

For handling of large size flexible packages two or multiple adjacent slits can be used per package.

Further preferred embodiments are stated in the subclaims.

The invention also relates to a carrier for use in the claimed apparatus, and to a method for operating the claimed apparatus.

The invention shall be explained in more detail below with reference to the accompanying drawings, in which:

- Fig. 1 shows a schematic view of a hydrostatic continuous steriliser apparatus with vertically orientated tower sections according to the invention;
- Fig. 2 shows an enlarged partial view of the inlet station of fig. 1;
- Fig. 3a-f show enlarged perspective views of the carrier of fig. 2 during respective loading steps;
- Fig. 4a-b show a positioning of the carriers when transported along U-turn sections of the apparatus of fig. 1, with the carriers being non-rotatably connected to the conveyor;
- Fig. 5a-b are views according to fig. 4b with the carriers being rotatably connected to the conveyor; and
- Fig. 6 is a view according to fig. 1 of a variant with horizontally orientated track sections.

In fig. 1 the steriliser apparatus in its entirety has been given the reference numeral 1. The apparatus 1 comprises a number of tower sections 2 which are placed adjacent to each other. The tower sections 2 are filled with heated or cooled process media and form heating and cooling chambers 3. Some of the tower sections 2 are filled with fluid columns such that an increased pressure can be obtained with high temperature damp phases in adjacent tower sections 2. An endless conveyor 4, which here is formed by two interspaced endless chains, runs meandering with partly straight, vertically orientated track sections through the respective chambers 3. The tower sections 2 are connected to each other by means of upper and lower U-turn sections 5, 6. Guiding wheels 7 are provided in the upper U-turn sections 5 for guiding the conveyor 4 along. In the lower U-turn sections 6 no guiding wheels are provided. There the conveyor 4 can be moved as free hanging loops.

Elongated stainless steel product carriers 10 are fixedly connected to the chains of the conveyor 4. See fig. 2-4. As can particularly be seen in fig. 3, each carrier 10 comprises an outer first side wall 11, an intermediate second side wall 12 and an outer third side wall 12 which extend parallel to each other in a horizontal direction. Partition walls 14 extend in a

vertical direction in between the side walls 11, 12, 13. Furthermore a bottom wall 15 is provided which extends in a horizontal direction. Together the side walls 11, 12, 13, the partition walls 14 and the bottom wall 15 delimit a first and second row of rectangular pocket-like insertion spaces 17a, 17b. Each insertion space 17a, 17b has an insertion opening 18a, 18b opposite the bottom wall 15.

According to the invention the first and second side walls 11, 12 are provided with primary and secondary slits 20, 21, which here are formed as U-shaped cut-outs. The slits 20, 21 open out towards the insertion openings 18 and extend in a so-called insertion direction X towards the bottom wall 15.

An inlet station 24 is positioned at a right side of the apparatus 1. An outlet station 25 is positioned at a left side of the apparatus 1.

During use the conveyor 4 gets driven to transport the carriers 10 at a substantially constant speed through the respective chambers 3 from the inlet station 24 towards the outlet station 25. At the positions of the stations 24, 25 the carriers 10 can temporarily be held at a stand still such that flexible food packages 27 can be placed in or taken out of the insertion spaces 17. In order to be able to obtain this intermittent transport of the carriers 10 past by the stations 24, 25, the conveyor 4 has the freedom to form bigger or smaller free hanging loops 4a, 4b in front of the stations 24, 25.

The inlet station 24 is provided with a conveyor belt 30a for moving the flexible food packages 27 towards the first row of insertion spaces 17a of a carrier 10 which has been stopped in front of it, and a conveyor belt 30b for at a same time moving the flexible food packages 27 towards the second row of insertion spaces 17b of another carrier 10 which has been stopped in front of it.

At the ends of the belts 30a, 30b, first operating members 31a, 31b are provided. Each operating member 31 comprises two vacuum bars 32 at the end of which suction heads 33 are provided. The assemblies of the vacuum bars 32 and suction heads 33 can be moved back and forth in the insertion direction X, which here is horizontally directed, into and out of the insertion spaces 17. For this operable translation means 34 are provided. When operated, the suction heads 33 are able to pick up the flexible food packages 27 from the respective belts 30 and then carry them freely floating into the respective rows of insertion spaces 17. During this movement the vacuum bars 32 get to project through the slits 20, 21 of the carrier 10 that gets loaded.

As can be seen in fig. 1, 2 the vacuum bars 32b are dimensioned prolonged relative to the vacuum bars 32a. This makes it possible for the vacuum bars 32b to project not only through the slits 20 in the upper first side wall 11, but also through the slits 21 in the intermediate second side wall 12, during placing of packages 27 into the second row of insertion spaces 17b. The vacuum bars 32a only need to project through the slits 20 in the

upper first side wall 11 during placing of packages 27 into the first row of insertion spaces 17a, and therefore can be dimensioned shorter.

During loading a respective carrier 10 first gets stopped in front of the belt 30b and operating members 31b. Packages 27 can then be carefully picked up and placed in the second insertion spaces 17b (fig. 3a-c). Subsequently the respective carrier 10 can get transported towards and stopped in front of the belt 30a and operating members 31a. Packages 27 can then be carefully picked up and placed in the first insertion spaces 17a (fig. 3d-f). Thus an efficient two-step loading method is possible.

After being sterilized inside the chambers 3 the thermally processed packages 27 in a similar manner can be unloaded from the carriers 10 again at the outlet station 25. Owing to the fixed connection of the carriers 10 to the conveyor 4, the carriers 10 get stopped in front of the outlet station 25 turned upside down, that is to say with their slits 20, 21 at lower sides of the carriers 10. Therefore, at the outlet station 25 a double set of second operating members 36 is provided which have their vacuum bars and suction heads project upwards (instead of downwards as is the case at the inlet station 24). In this way they are able to connect to the packages 27 lying in the carriers 10 and then carefully move them out of there and place them on top of conveyor belts 37. The unloading here is performed as an efficient two-step unloading method in which first the packages are taken out of the first row of insertion spaces and subsequently out of the second row of insertion spaces.

It is noted that owing to the fixed connection of the carriers 10 to the conveyor 4, the carriers 10 actively co-rotate together with the chain links when passing by the U-turn sections 5, 6. See also fig. 4a-b. Thus the packages 27 placed inside the carriers 10 advantageously get mildly agitated during the sterilization.

In a variant it is also possible to connect the carriers 10 rotatably to the conveyor 4. This makes it possible for the carriers 10 to substantially maintain their positions relative to the conveyor 4 throughout their entire transport through the chambers 3 even when they pass by the U-turn sections 5, 6.

Fig. 5a shows a variant of such a rotatable connection in which the carriers 10 have the full freedom to maintain a certain positioning, in this case a horizontal positioning, relative to the horizontal during their passing of the U-turn section 5.

Fig. 5b shows a variant of such a rotatable connection in which the carriers 10 can be actively given an aimed rotational movement. Rotational movement then can be obtained by means of a driven rotation chain. Each carrier 10 then can be provided with a chain wheel which grips into this rotation chain. The swinging movements can be seen in the number of differing positions which are shown for the respective carriers 10 when passing the U-turn section 5. In addition or in the alternative it is also possible to give the carriers the aimed rotational movement when they move along the straight track sections. Thus the packages

27 placed inside the carriers 10 advantageously can get actively rotated and thus can get agitated during the sterilization.

Further it is noted that each of the carriers can be provided with a closable hatch 40. This hatch 40 can be hingedly connected to the carrier 10 and can be automatically opened and closed before and after the stations 24, 25. The hatches 40 may help to prevent the packages 27 from starting to float out of the carriers 10 when transported through those tower sections 2 that are filled with fluid columns. Also these hatches 40 make it possible for the carriers 10 to get actively rotated even such that the insertion openings 18a, 18b may temporarily get directed downwards. This is shown in fig. 5b.

Fig. 6 shows a variant in which only one heating and/or cooling chamber 60 is provided. An endless conveyor 61 runs with horizontally and vertically orientated tracks 61a respectively 61b through the chamber 60 and is guided over a plurality of guiding wheels 62. Outside the chamber 60, inlet and outlet stations 63, 64 are provided. In this case the inlet and outlet stations 63, 64 are positioned at a same side of the chamber 60. For this variant also an advantageous use can be made of the inventive carriers which are provided with slits such that load bearing organs are able to freely move back and forth there through during loading and/or unloading of the carriers at the loading and unloading stations 63, 64.

Besides the embodiments shown numerous variants are possible. For example the shapes and dimensions of the carriers, slits and the like can be varied. Instead of being used for sterilization purposes it is also possible to use the carriers for other types of thermal processing, like pasteurization. Besides being driven at a constant speed, it is also possible to have the conveyor driven intermittently. It is also possible to provide each of the insertion spaces with two or more slits such that it also gets possible to load and unload larger dimensioned flexible packages therein by means of a corresponding number of adjacent operating members. Besides flexible packages it is also possible to treat other types of packages inside the apparatus.

Thus the invention provides an advantageous carrier design which in particular can be used in an efficient manner for sterilization of vulnerable flexible packages in a hydrostatic continuous steriliser. High capacities of more than 1000 packages/minute have appeared possible with this.

C O N C L U S I E S

1. Inrichting voor het thermisch behandelen van voedselproducten in afgedichte verpakkingen, in het bijzonder flexibele verpakkingen, omvattende:

- één of meer verwarmings- en/of koelingskamers;
- een eindloos transportorgaan dat door de kamers geleid is;
- meerdere productdragers die op onderlinge afstand verbonden zijn met het transportorgaan, waarbij elke drager ten minste een eerste rij van insteekruimtes omvat voor het daarin plaatsen van verpakkingen, welke insteekruimtes elk een insteekopening hebben en welke eerste rij van insteekruimtes ten minste gedeeltelijk begrensd wordt door een eerste zijwand en een tegenoverliggende tweede zijwand; en
- een inlaatstation dat één of meerdere eerste bedieningselementen omvat die bedienbaar zijn om in en uit de insteekruimtes te bewegen voor het bewegen van verpakkingen in een insteekrichting in de insteekruimtes, welke insteekrichting zich in hoofdzaak evenwijdig uitstrekt aan de zijwanden;

waarbij het transportorgaan is ingericht voor het transporteren van de dragers met in de insteekruimtes daarvan geplaatste verpakkingen, door de één of meerdere verwarmings- en/of koelingskamers,

met het kenmerk, dat

de eerste zijwand ten minste één primaire sleuf omvat voor elke insteekruimte, welke primaire sleuf zich in hoofdzaak uitstrekt in de insteekrichting, en welke primaire sleuf uitmondt naar de insteekopening van de betreffende insteekruimte,

waarbij de eerste bedieningselementen lastdragende organen omvatten met bedienbare vashoudmiddelen aan hun buitengelegen einden voor het oppakken en dragen van verpakkingen, welke lastdragende organen zich in hoofdzaak in een dwarsrichting ten opzichte van de zijwanden uitstrekken, en welke lastdragende organen beweegbaar zijn in de insteekrichting terwijl zij zich door de primaire sleuven uitstrekken tijdens het plaatsen van verpakkingen in de eerste rij van insteekruimtes.

2. Inrichting volgens conclusie 1, waarbij elke drager verder een tweede rij van insteekruimtes omvat voor het daarin plaatsen van verpakkingen, welke tweede rij van insteekruimtes ten minste gedeeltelijk begrensd wordt door de tweede zijwand en een tegenoverliggende derde zijwand,

waarbij de tweede zijwand ten minste één secundaire sleuf omvat voor elke insteekruimte van de tweede rij van insteekruimtes, welke secundaire sleuf zich in hoofdzaak uitstrekt in de insteekrichting, en welke secundaire sleuf uitmondt naar de insteekopening van de betreffende insteekruimte.

3. Inrichting volgens conclusie 2, waarbij de lastdragende organen beweegbaar zijn in de insteekrichting terwijl zij zich door zowel de primaire en secundaire sleuven uitstrekken tijdens het plaatsen van verpakkingen in de tweede rij van insteekruimtes.

4. Inrichting volgens een van de voorgaande conclusies, waarbij elke insteekruimte verder begrensd wordt door twee tegenover elkaar liggende scheidingswanden die verbonden zijn met de zijwanden.

5. Inrichting volgens een van de voorgaande conclusies, waarbij een uitlaatstation voorzien is dat een of meer tweede bedieningselementen omvat die bedienbaar zijn om in en uit de insteekruimtes te bewegen voor het in de insteekrichting uit de insteekruimtes bewegen van verpakkingen,
waarbij de tweede bedieningselementen lastdragende organen omvatten met bedienbare vasthoudmiddelen aan hun buitengelegen einden voor het oppakken en dragen van verpakkingen, welke lastdragende organen zich in hoofdzaak in een dwarsrichting uitstrekken ten opzichte van de zijwanden, en welke lastdragende organen beweegbaar zijn in de insteekrichting terwijl zij zich door de primaire sleuven uitstrekken tijdens oppakken van verpakkingen uit de eerste rij van insteekruimtes.

6. Inrichting volgens een van de voorgaande conclusies, waarbij de sleuven een breedte hebben van minder dan 50 mm, in het bijzonder ongeveer 30 mm.

7. Inrichting volgens een van de voorgaande conclusies, waarbij de sleuf op afstand van een bodemwand die de insteekruimte begrenst eindigt, in het bijzonder op een afstand van ten minste 10 mm.

8. Inrichting volgens een van de voorgaande conclusies, waarbij de verwarmings- en/of koelingskamers verticaal georiënteerde torensecties omvatten, waarbij het transportorgaan zich meanderend daardoorheen uitstrekt.

9. Inrichting volgens een van de voorgaande conclusies, waarbij de verwarmings- en/of koelingskamers horizontaal georiënteerde baansecties omvatten, waarbij het transportorgaan zich daar meanderend doorheen uitstrekt.

10. Inrichting volgens een van de voorgaande conclusies, waarbij de zijwanden van de dragers een gatenpatroon omvatten voor het daardoorheen laten stromen van een verwarmings- en/of koelingsmedium.

11. Inrichting volgens een van de voorgaande conclusies, waarbij de dragers afsluitbare dekseldeuren hebben voor het afsluiten van de insteekopeningen tussen de inlaat- en uitlaatstations.

12. Inrichting volgens een van de voorgaande conclusies 1 - 11, waarbij de dragers niet-roteerbaar verbonden zijn met het transportorgaan.

13. Inrichting volgens een van de voorgaande conclusies 1 - 11, waarbij de dragers roteerbaar verbonden zijn met het transportorgaan.

14. Inrichting volgens een van de voorgaande conclusies, waarbij de dragers vervaardigd zijn uit roestvrijstaal.

15. Drager voor het dragen van voedselproducten in afgedichte verpakkingen door een inrichting voor het thermisch behandelen van de voedselproducten, waarbij de drager ten minste een eerste rij van insteekruimtes omvat voor de daarin door een bedieningselement in een insteekrichting te plaatsen verpakkingen, welke insteekruimtes elk een insteekopening hebben die in de insteekruimte leidt en welke eerste rij van insteekruimtes ten minste gedeeltelijk begrensd wordt door een eerste zijwand en een tegenoverliggende tweede zijwand,
met het kenmerk, dat
de eerste zijwand ten minste één primaire sleuf omvat voor elke insteekruimte, welke primaire sleuf zich in hoofdzaak uitstrekt in de insteekrichting, en welke primaire sleuf uitmondt naar de insteekopening van de betreffende insteekruimte voor opname van het bedieningselement tijdens insteken en verwijderen van de verpakkingen.

16. Werkwijze voor het bedrijven van de inrichting volgens een van de voorgaande conclusies, omvattende de stappen van:
- oppakken van afgedichte voedselverpakkingen met de eerste bedieningselementen;
- het de eerste bedieningselementen laten plaatsen van de verpakkingen in de insteekruimtes van de dragers terwijl de lastdragende organen door de primaire sleuven bewegen;
- het transporteren van de dragers door de verwarmings- en/of koelingskamers terwijl de verpakkingen thermisch behandeld worden;
- het uitladen van de thermisch behandelde verpakkingen uit de dragers.

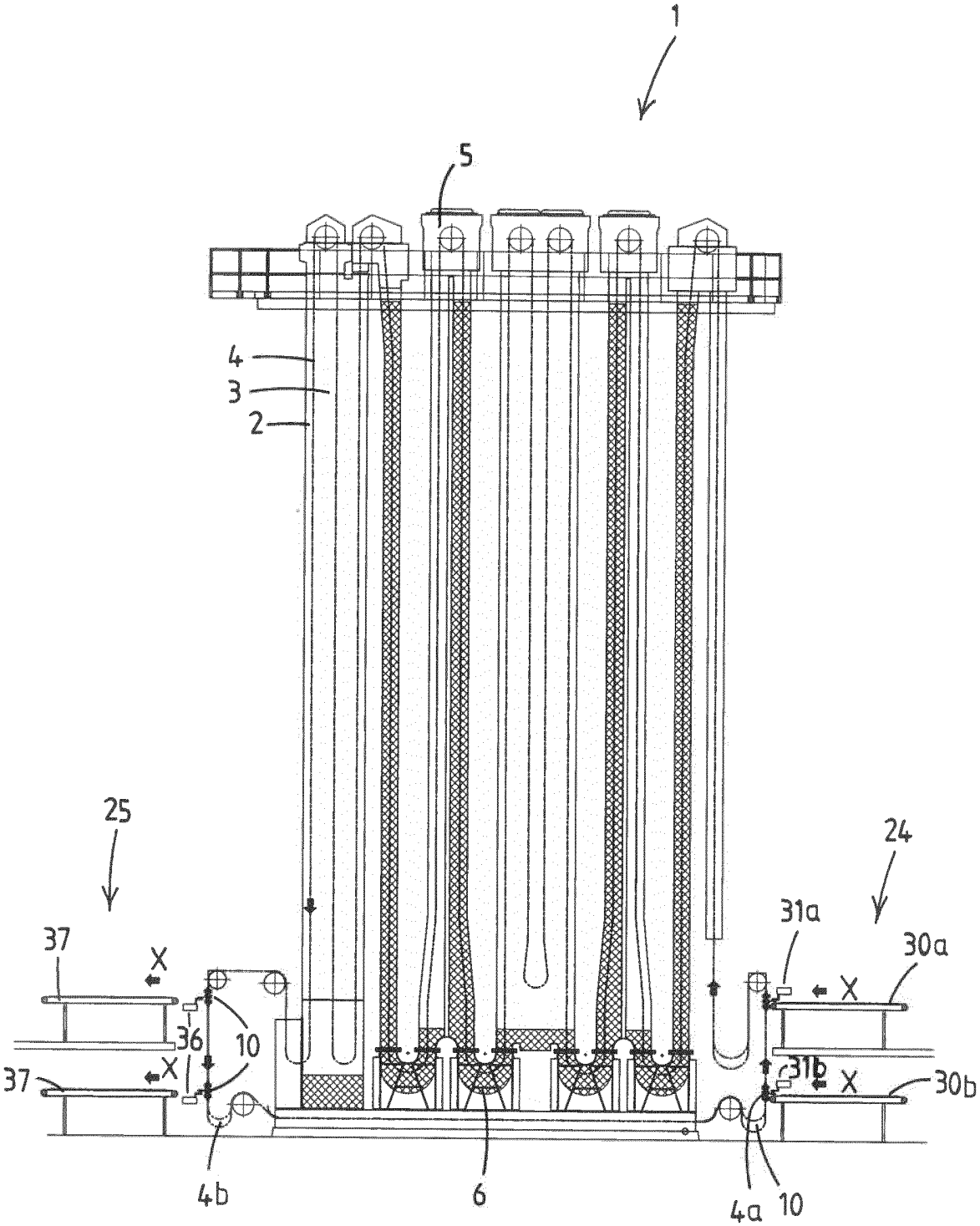

Fig.1

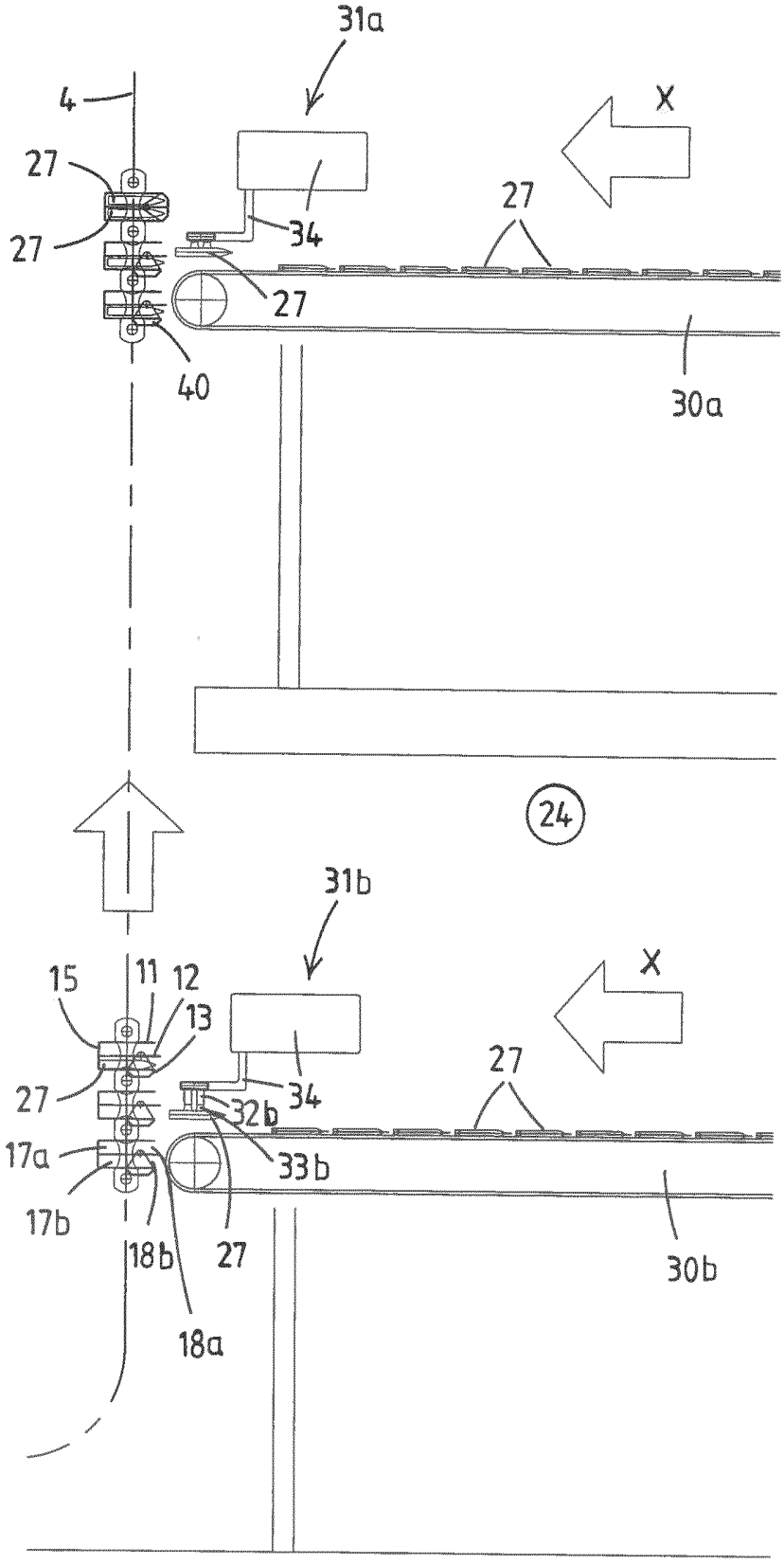
31a
4
X
27
27
34
27
27
40
30a
24
31b
15
11
12
13
X
27
27
34
32b
17a
33b
17b
18b
27
30b
18a

Fig.2

Step 1

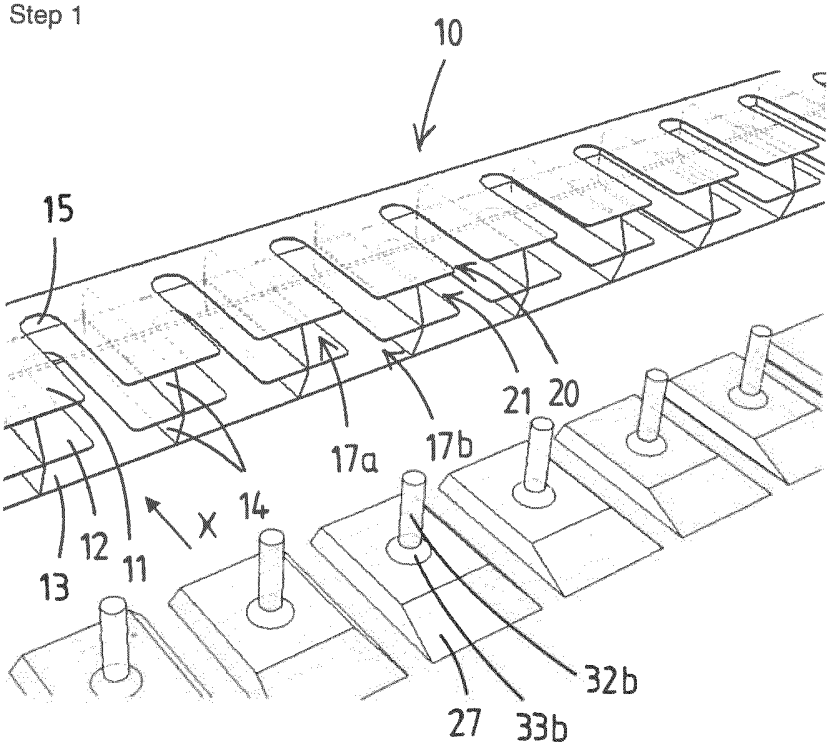

Fig.3a

Step 2

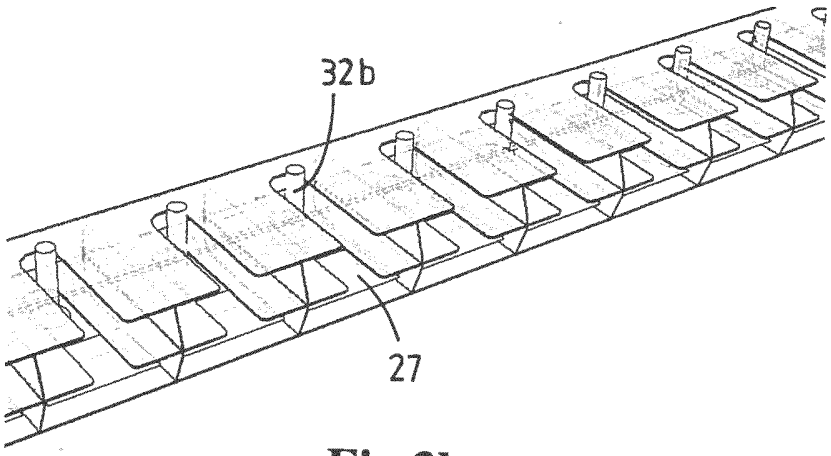

Fig.3b

Step 3

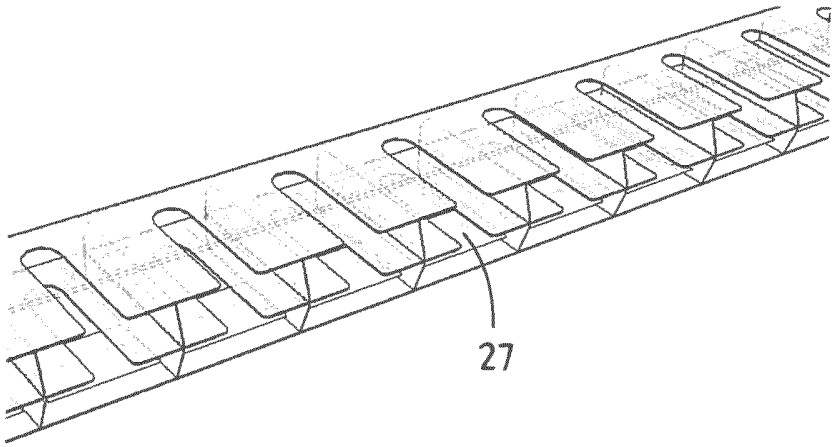

Fig.3c

Step 4

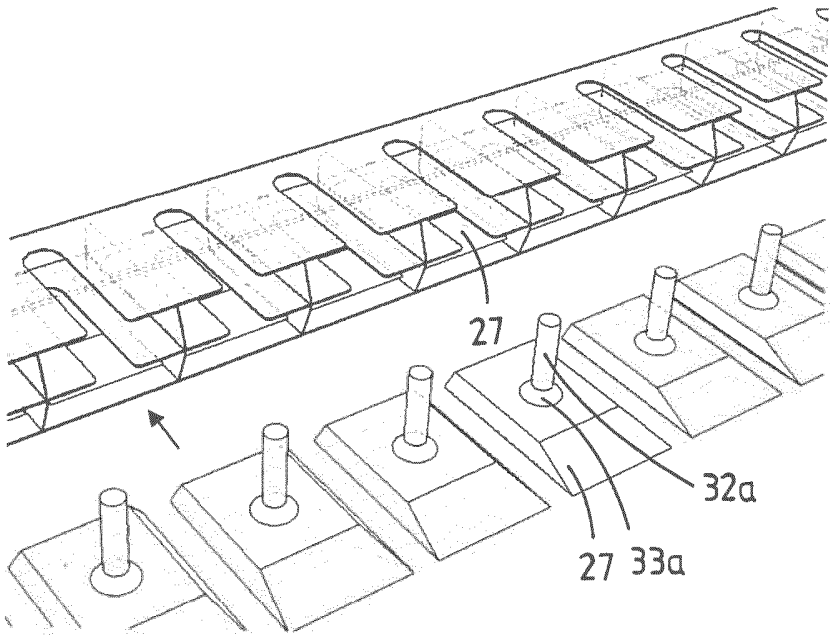

Fig.3d

Step 5

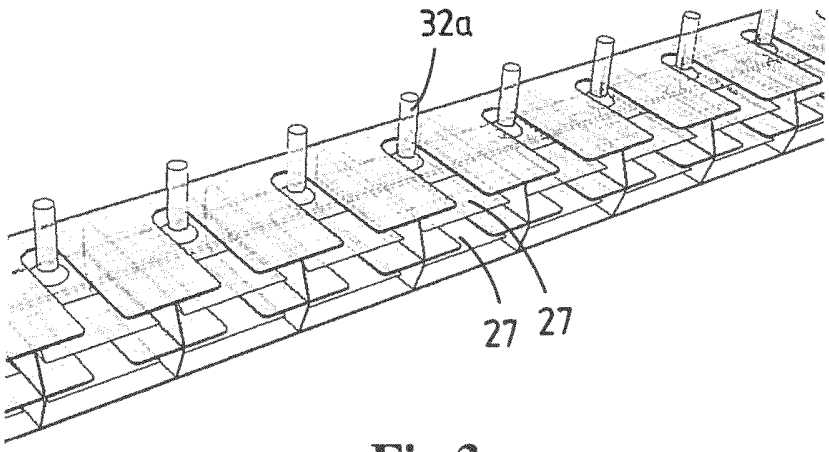

Fig.3e

Step 6

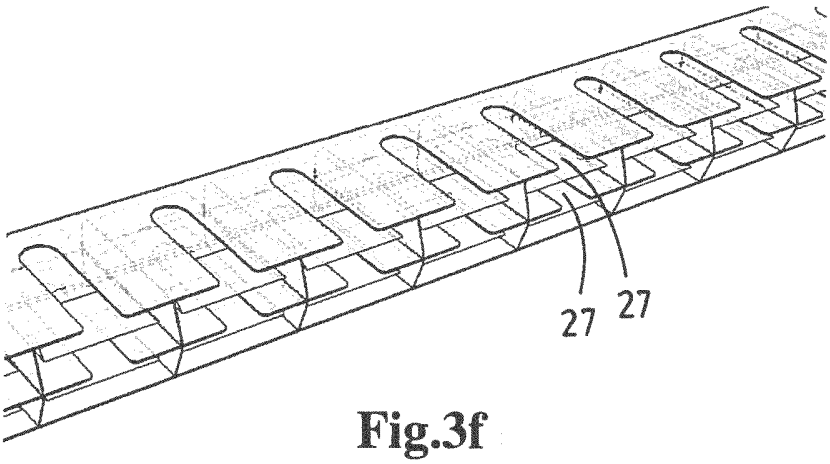

Fig.3f

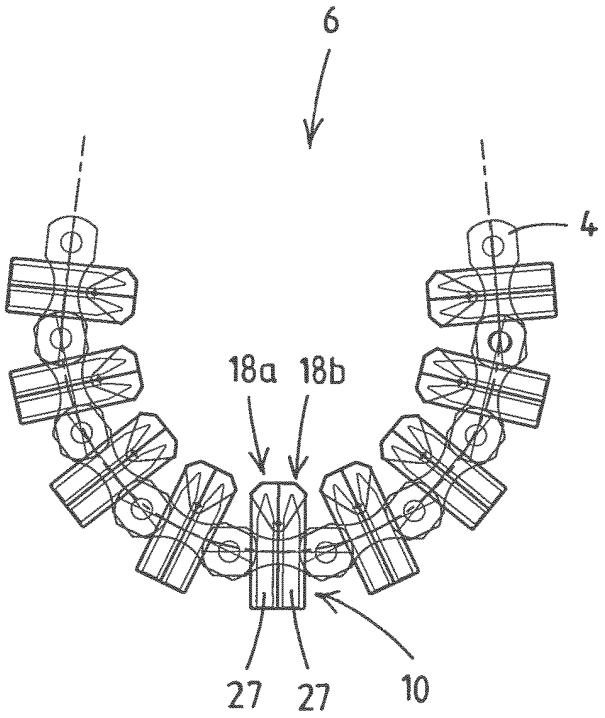

Fig.4a

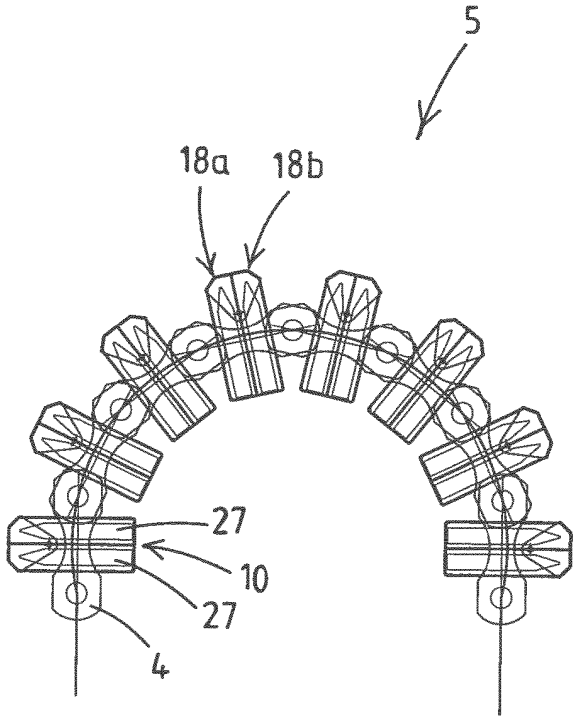

Fig.4b

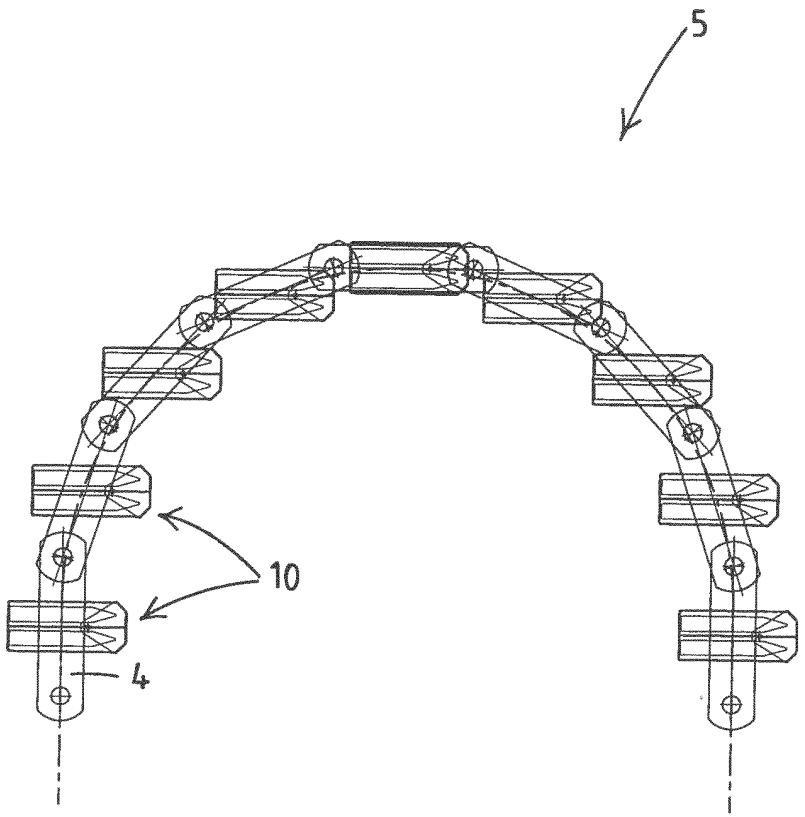

Fig.5a

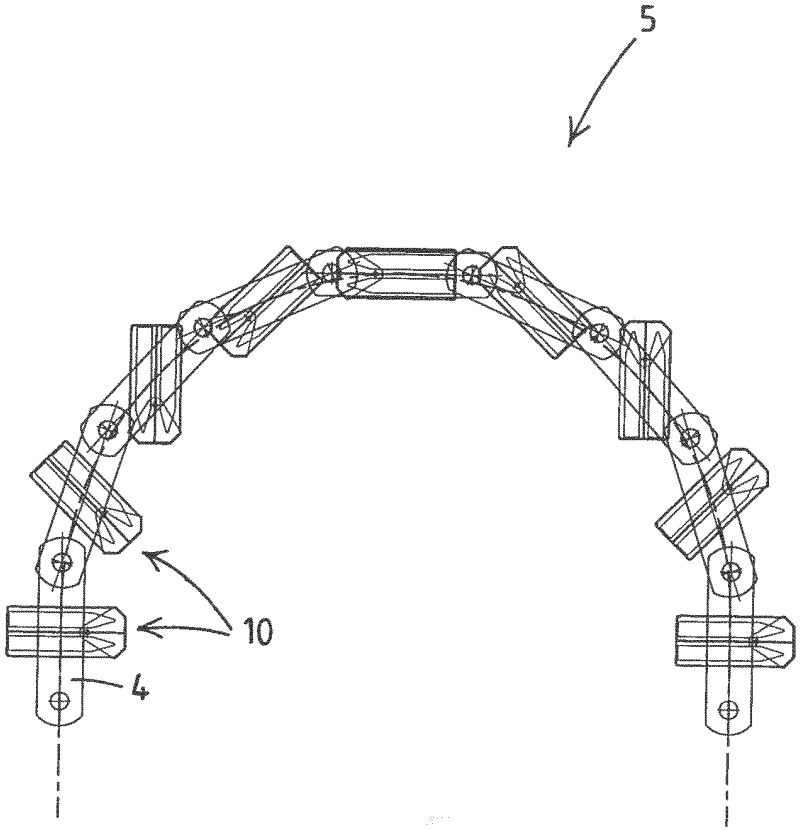

Fig.5b

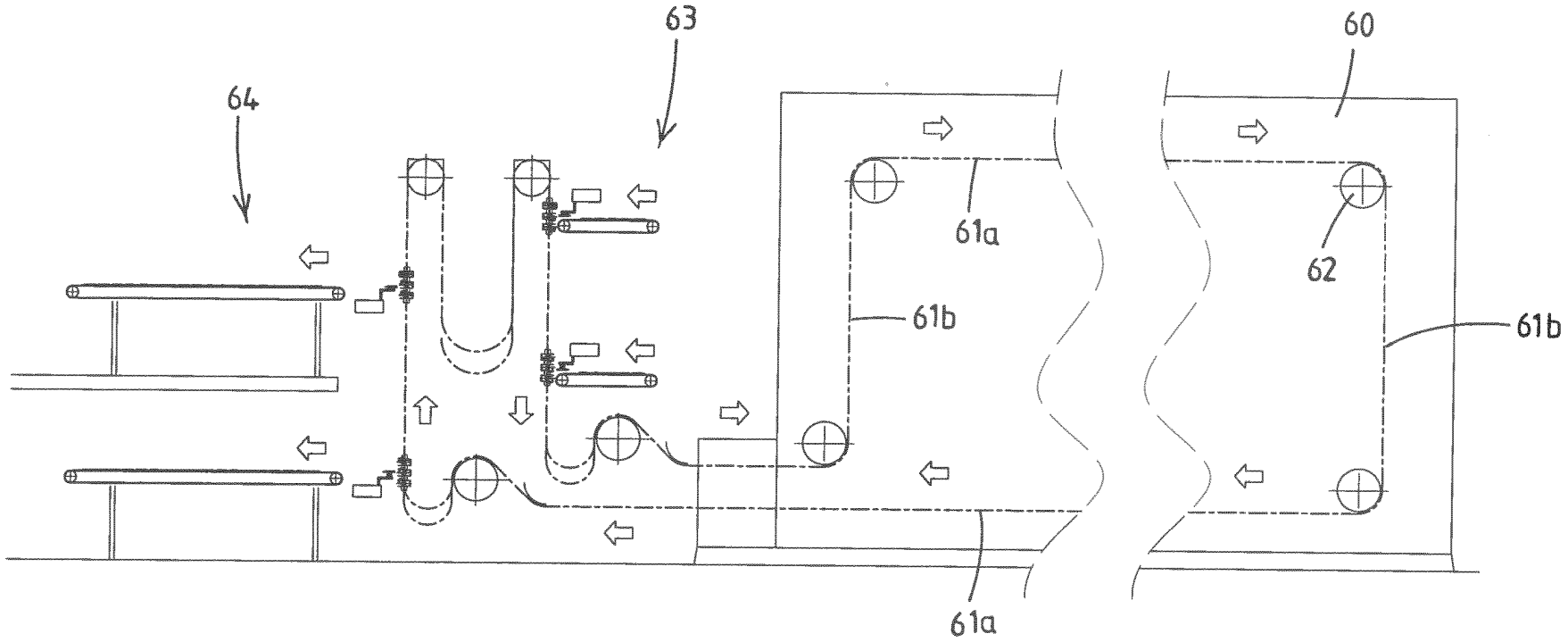

Fig.6

ABSTRACT

An apparatus for thermally processing food products in sealed packages comprises heating/cooling chambers with an endless conveyor guided through them with product carriers connected thereto. Each product carrier 10 comprises insertion spaces 17 for packages 27 to be placed in. A side wall 11 of the carrier 10 comprises slits 20 which open out towards insertion openings of the respective insertion spaces 17. Operating members are provided which comprise load bearing organs 32 with operable holding means 33 for picking up and carrying packages 27. The load bearing organs 32 are movable in an insertion direction x while projecting through the slits 20 during placing of packages 27 into the insertion spaces 17.

+ Fig. 3a

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P31943NL00/RR
Nederlands aanvraag nr. **2012876**	Indieningsdatum **23-05-2014**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **ICS Solutions B.V.**	
Datum van het verzoek voor een onderzoek van internationaal type **15-07-2014**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN 62380**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

A23L3/04 **B65B55/00**

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen	
IPC	**A23L**	**B65B**

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 2012876

A. CLASSIFICATIE VAN HET ONDERWERP
INV. A23L3/04 B65B55/00
ADD.

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

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
A23L B65B

Onderzochte andere documentatie dan de mimimum 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, BIOSIS, COMPENDEX, EMBASE, FSTA, 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	GB 2 074 528 A (AGROBER MEZOEGAZDASAGI ELELM) 4 november 1981 (1981-11-04) * bladzijde 2, regel 130 - bladzijde 3, regel 11; figuur 12c *	14
A	WO 88/04143 A1 (BAXTER TRAVENOL LAB [US]) 16 juni 1988 (1988-06-16) * conclusies; figuren *	1-15
A,D	EP 0 891 781 A2 (FRESENIUS AG [DE]) 20 januari 1999 (1999-01-20) in de aanvraag genoemd * het gehele document *	1-15

☐ 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 octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), 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 octrooiaanvrage, 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	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
18 november 2014	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Smeets, Dieter

1

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 2012876

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)		Datum van publicatie
GB 2074528	A 04-11-1981	BE	888592 A1	17-08-1981
		DE	3116822 A1	11-02-1982
		DE	8112567 U1	09-08-1990
		FR	2481235 A1	30-10-1981
		GB	2074528 A	04-11-1981
		HU	178860 B	28-07-1982
		IT	1137564 B	10-09-1986
		LU	83300 A1	24-07-1981
		NL	8102082 A	16-11-1981
		YU	105581 A	31-10-1983
WO 8804143	A1 16-06-1988	NL	8603157 A	01-07-1988
		WO	8804143 A1	16-06-1988
EP 0891781	A2 20-01-1999	AT	250428 T	15-10-2003
		DE	19730901 A1	21-01-1999
		DE	59809694 D1	30-10-2003
		DK	0891781 T3	17-11-2003
		EP	0891781 A2	20-01-1999
		ES	2203857 T3	16-04-2004

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN62380	23.05.2014		NL2012876

International Patent Classification (IPC)
INV. A23L3/04 B65B55/00

Applicant
ICS Solutions 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
	Smeets, Dieter

Application number

WRITTEN OPINION

NL2012876

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	1-13, 15
	No:	Claims	14
Inventive step	Yes:	Claims	1-13, 15
	No:	Claims	14
Industrial applicability	Yes:	Claims	1-15
	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 GB 2 074 528 A (AGROBER MEZOEGAZDASAGI ELELM) 4 november 1981 (1981-11-04)

D2 WO 88/04143 A1 (BAXTER TRAVENOL LAB [US]) 16 juni 1988 (1988-06-16)

D3 EP 0 891 781 A2 (FRESENIUS AG [DE]) 20 januari 1999 (1999-01-20)in de aanvraag genoemd

2 Lack of novelty

2.1 D1 (p. 2, l. 130 - p. 3, l. 11; fig. 12c) discloses a carrier built from flat plates. A longitudinal slit is provided in the mantle to facilitate the introduction and removal of cans. The slit on the mantle must not be provided over the whole length of the bucket but only over a part of it.

The carrier is considered to be suitable in a device according to claim 1.

Hence, D1 is considered novelty destroying for the subject-matter of claim 14.

3 Inventive step

3.1 D2 (claims; figures) is considered to be closest prior art for the subject-matter of independent claims 1 and 15. Said document discloses an apparatus for thermal treatment of plastic bags comprising through-shaped carriers, attachable to the endless conveyor, for receiving, transporting and discharging the plastic bags. Each carrier is constructed from three separate parts: two bases each with a W-shaped cross section and a sidewall with a U-shaped cross section. During operation of the apparatus, an opening of the carrier is parallel to the plane of the endless conveyor.

3.2 Claim 1 on file also relates to an apparatus comprising one or more heating and/or cooling chambers, an endless conveyor guided through the chambers, and a plurality of product carriers connected interspaced to the conveyor. Each carrier comprises at least a first row of insertion spaces for packages to be placed in. The insertion spaces each have an insertion opening and the first row of insertion spaces is at least partly delimited by a first side wall and an opposite second side wall. An inlet station is provided which comprises one or more first operating members which are operable to move in into and out of the insertion spaces for moving packages in an insertion direction into the

insertion spaces. The insertion direction extends substantially parallel to the side walls. The conveyor is designed for transporting the carriers with packages placed in the insertion spaces thereof through the one or more heating and/or cooling chambers.

The subject-matter of claim 1 differs from D2 in that the first side wall comprises at least one primary slit for each insertion space. This primary slit extends substantially in the insertion direction, and opens out towards the insertion opening of its respective insertion space. The first operating members comprise load bearing organs with operable holding means at their outer ends for picking up and carrying packages. The load bearing organs extend at least partly substantially in a transverse direction relative to the side walls, and are movable back and forth in the insertion direction through the primary slits during placing of packages into the first row of insertion spaces.

3.3 The objective technical problem is therefore an alternative user-friendly and reliable apparatus for thermally processing food packages with which the food packages can be positively handled during insertion into and/or removal out of a product carrier without running the risk of getting damaged and without negatively influencing the thermal processing.

3.4 D2 does not teach or suggest the apparatus having the features of claim 1. D1 discloses a carrier having having a side wall comprising slit. D1 does however not disclose any load bearing organs which are movable back and forth in the insertion direction through the slits during placing of packages.

Consequently, the subject-matter of independent claims 1 and 15 is not derivable from D2 alone, or in combination with D1.

Claims 2-13 are dependent on claim 1 and as such also meet the requirements of inventive step.