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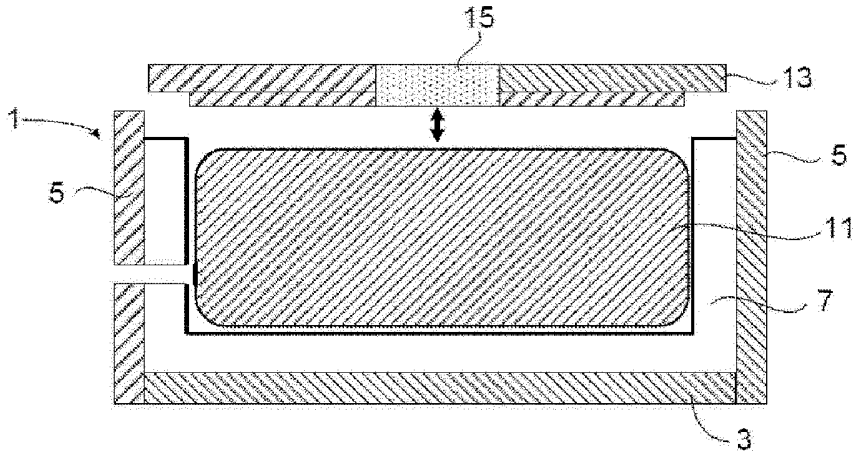
(54) **Heating apparatus, transportation unit, system and method for removing foodstuffs.**

(57) The invention relates to an apparatus for heating foodstuffs that are highly viscous or solid at ambient temperatures. The apparatus includes a housing and a heating system within the housing. The housing has a bottom wall and side walls. The housing is arranged to accommodate a transportation unit filled with the foodstuff and provided with an opening for removal of the foodstuff. The housing further includes an outlet opening. The heating system within the housing is provided with a heat transfer surface for transferring heat to the transportation unit during use. The heat transfer surface of the heating system is arranged to embrace at least about 40% of the outer surface of the transportation unit.



# HEATING APPARATUS, TRANSPORTATION UNIT, SYSTEM AND METHOD FOR REMOVING FOODSTUFFS

## Field of the invention

The invention relates to an apparatus for heating foodstuffs that are highly viscous or solid at ambient temperatures. The invention further relates to a transportation unit for transporting foodstuffs. The invention further relates to a system for removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit. Finally, the invention relates to a method of removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit.

## Background of the invention

The transport of large quantities of highly viscous or solid foodstuffs at ambient temperatures has proven to be cumbersome. Due to this solidification or high viscosity such foodstuffs can only be transferred while being at a temperature above normal ambient temperatures, that is above about 15 – 25 °C.

An example of a foodstuff that is highly viscous at ambient temperatures is glucose syrup. Due to the high viscosity, transfer of glucose syrup from one unit to another unit at these temperatures is very difficult and heating is needed. It turns out that glucose syrup needs to be heated to at least about 50 °C before transport between units by means of pumping can be performed. At lower temperatures the viscosity is too high to allow for easy transport. Other examples of foodstuffs that experience difficult transfer at ambient temperature due to high viscosity include melasse, lecithin and honey. Examples of foodstuffs that are substantially solid at ambient temperatures include palm oil and fat.

For efficiency reasons, heating of viscous foodstuffs like glucose syrup is performed just before inserting the foodstuff in transportation units at a point of departure. A similar procedure is followed at the point of arrival to remove the foodstuff from the transportation unit to another transportation unit or to a (temporary) storage unit.

US-patent 5,884,814 describes an apparatus for ensuring the pumpability of fluids exposed to temperatures below the pour point of such fluids. The apparatus consists of

a container, a portable heat exchanger pad to be placed on the bottom surface of the container, and a flexible bladder positioned immediately on top of the heat exchanger pad, where the flexible bladder is at least partially filled with the pumpable fluid. Although the use of this apparatus makes it possible to transfer such fluids in smaller packages, further improvement is desired, in particular with respect to the manageability of the fluids and the time involved for heating.

Summary of the invention

The object of the invention is to provide a system for removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit by heating and pumping with improved properties. For this purpose, an embodiment of the invention provides an apparatus for heating foodstuffs that are highly viscous or solid at ambient temperatures, the apparatus comprising: a housing having a bottom wall and side walls, the housing being arranged to accommodate a transportation unit filled with the foodstuff and provided with an opening for removal of the foodstuff, the housing further comprising an outlet opening; and a heating system within the housing provided with a heat transfer surface for transferring heat to the transportation unit during use, wherein the heat transfer surface of the heating system is arranged to embrace at least about 40% of the outer surface of the transportation unit. This apparatus allows relatively quick heating of foodstuffs in the transportation unit in a relatively homogeneous and gradual way. Due to the quick heating without the presence of a large temperature gradient within the transportation unit foodstuff removal can be performed within a limited period of time without loss of quality due to excessive heating.

The heat transfer surface may include the outer surfaces of tubes, sheets or panels. In some embodiments, the tubes, sheets or panels form a frame for supporting the transportation unit. Supporting the transportation unit may improve the contact area between the heat transfer surface and the transportation unit which may enhance heat transfer.

In case the heat transfer surface includes the outer surface of panels, at least one of the surfaces of the heat panels facing a space within the housing for accommodating the transportation unit during use may comprise a plurality of burls. The use of burls may increase the contact area between the heat transfer surface and the transportation unit, which may enhance heat transfer.

In some embodiment, the apparatus further comprises a lid. The lid may be a removable lid which, if present, forms an upper wall substantially covering the housing. Alternatively, the lid may be connected to one of the side surfaces via one or more hinges. The lid may then be pivotable about the one or more hinges to form an upper wall substantially covering the housing if closed. The lid blocks heat so that less heat can "escape" and more heat can be used to reduce the viscosity of the foodstuffs in the transportation unit. The lid may be provided with a transparent portion. The transparent portion may assist an operator in checking the functionality of the apparatus, for example to check how the heating process is progressing and/or to see whether the heating apparatus is occupied or not. Instead of a lid substantially covering the housing, in some embodiments the housing further comprises an upper wall provided with a lid portion. The lid portion may be removable or may be pivotable about one or more hinges.

Some embodiments of the invention relate to a transportation unit for transport of foodstuffs that are highly viscous or solid at ambient temperatures, the transportation unit comprising: a first bag made from a woven fabric, preferably a woven polymer, the first bag having an upper side and a bottom side, the first bag being arranged to accommodate a second bag; a second bag arranged to fit into the first bag, the second bag comprising a opening for inserting and/or removing the foodstuffs; and one or more hoist bands wrapped around the bottom side of the first bag and connected thereto, the one or more hoist bands forming loops above the upper side of the first bag; wherein the first bag comprises a transfer opening for removing the foodstuffs from the transportation unit. Such transportation unit can be easily heated, in particular in embodiments of a heating apparatus as described above, which allows for efficient transport of foodstuffs that are highly viscous or solid at ambient temperatures.

The first bag may comprise a closeable opening to allow insertion of the second bag. The closeable opening can improve the orientation and/or positioning of the second bag within the first bag to obtain good transport results. The second bag may comprise a first transfer opening for insertion of foodstuffs and a second transfer opening for removal of foodstuffs. In some embodiments, the second bag further comprises a pressure control opening for allowing pressure control within the second bag. The pressure control opening may be used to allow the inner bag to suitably fit into the outer bag. In addition, or alternatively, the pressure control opening may be

used during removal of the foodstuffs by providing an overpressure via the pressure control opening into the inner bag. If the transfer opening for removal is the only one being opened, the applied overpressure then helps to push the foodstuffs out.

In some embodiments, the first bag is provided with a coupling unit having a first end at the inner side of the first bag for coupling to the opening of the second bag, and a second end at the outside of the first bag for coupling for further foodstuff transfer.

In some embodiments, the woven fabric is a woven polymer comprising poly-propylene, preferably cold-drawn poly-propylene. Woven polymers such as cold-drawn poly-propylene may have a tensile strength greater than about 170 kN/m, preferably greater than about 200 kN/m, which is sufficient to withstand forces exerted by 4000 kg of glucose syrup. Such tensile strength may in particular be desirable in case the transportation unit is designed to be reusable.

In some embodiments, the one or more hoist bands are connected to the first bag by stitching. The yarn used for stitching may comprise polypropylene with a tensile strength greater than about 5 grams per denier, preferably greater than about 6 grams per denier. Such tensile strength is sufficient to withstand forces exerted by large masses of foodstuffs. A tensile strength greater than about 6 grams per denier is in particular in case the transportation unit is designed to be reusable.

Some embodiments of the invention further relate to a system for removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit, the system comprising: a heating apparatus according to any one of the abovementioned embodiments; a pump arranged for pumping the foodstuffs from a transportation unit placed in the heating apparatus; and one or more tubes for transferring the foodstuffs from the transportation unit towards a further storage unit by means of the pump. The heating apparatus may accommodate a transportation unit according to any one of the embodiments described above.

Finally, some embodiments of the invention relate to a method of removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit, the method comprising: providing an apparatus for heating foodstuffs, the apparatus comprising a housing and a heating system within the housing, wherein the housing has a bottom wall and side walls, and is arranged to accommodate a transportation unit filled with the foodstuff and provided with an opening for removal of the foodstuff, and wherein the heating system is provided with

a heat transfer surface for transferring heat to the transportation unit during use; providing a pump; placing a transportation unit filled with the foodstuffs and provided with an opening for removal of the foodstuff into the housing of the heating apparatus; coupling the pump to the transportation unit; heating the foodstuffs in the transportation unit; and removing the foodstuffs from the transportation unit by pumping. In case the housing is further provided with an outlet opening the coupling may include: connecting a transfer tube to the opening of the transportation unit through the outlet opening; and connecting the transfer tube to the pump.

Brief description of the drawings

Various aspects of the invention will be further explained with reference to embodiments shown in the drawings wherein:

FIGS. 1A, 1B schematically show differently oriented cross-sectional views of a heating apparatus according to an embodiment of the invention;

FIG. 2A schematically shows a heating system that may be used in a heating apparatus;

FIG. 2B schematically shows another heating system that may be used in a heating apparatus;

FIG. 3 schematically shows a lid that can be used in embodiments of the heating apparatus;

FIG. 4 schematically shows an embodiment of an outer bag;

FIG. 5 schematically shows an embodiment of an inner bag;

FIGS. 6A-6C schematically show different positions of a valve that is part of an inner bag according to an embodiment of the invention;

FIG. 7 schematically shows a block diagram of a method for removing foodstuffs according to an embodiment of the invention; and

FIG. 8 schematically shows a way of storing the transportation units in a container unit.

Description of illustrative embodiments

The following is a description of various embodiments of the invention, given by way of example only and with reference to the drawings.

FIGS. 1A, 1B schematically show a cross-section of an embodiment of an apparatus **1** for heating foodstuffs that are highly viscous or solid at ambient temperatures according to an embodiment of the invention. FIG. 1A is a cross-section along the width of the heating apparatus **1**, while FIG. 1B shows a cross-section taken along the length of the heating apparatus **1**.

The apparatus **1** comprises a housing having a bottom **3** and side walls **5**, and a heating system within the housing. The housing is arranged to accommodate a transportation unit **11** filled with foodstuffs that are highly viscous or solid at ambient temperatures. The housing may further comprise an outlet opening **7** for facilitating removal of foodstuffs from the heating apparatus **1**. The heating apparatus **1** may be moveable in its entirety, which enables flexible use of the apparatus at different locations.

The outlet opening **7** may be present in one of the side walls **5** as shown in FIG. 1B, but may also be placed in the bottom **3**. The outlet opening **7** may be arranged to accommodate a transfer tube inserted from the outside, the transfer tube being arranged for connecting to the transportation unit **11**. Instead of using an external transfer tube that can enter the housing through the outlet opening **7** for connection with the transportation unit **11**, the heating apparatus **1** may further comprise an internal transfer unit (not shown) having a first end arranged for connection to the transportation unit **11** and a second end arranged for connection to the outlet opening **7**. An external transfer tube would then be connected to the transfer unit at the outlet opening **7**. The internal transfer unit then facilitates foodstuffs transfer from the transportation unit **11** towards the outlet opening **17** of the housing. The transfer unit may take any form known to a skilled person to connect the transportation unit **11** with the outlet **7**, for example the transfer unit may be a transfer tube.

The heating system is provided with a heat transfer surface for transferring heat to the transportation unit **11** during use. In the embodiment shown in FIGS. 1A, 1B the heating system comprises one or more heat panels **9**. The heat transfer surface of these panels **9** corresponds with the surface facing the space in the housing for accommodating the transportation unit **11**. The use of heat panels **9** has the advantage that they enable easy construction of the heat transfer surface. Additionally, in case of a problem with one of the panels **9**, such as a broken panel, the malfunctioning panel

**9** can easily be replaced. In an embodiment, the surface of the one or more heat panels facing the space for accommodation of the transportation unit comprises a plurality of burls. A suitable commercially available material is Thermplate® manufactured by A. Leering in Enschede, the Netherlands.

The heat transfer surface of the heating system is arranged to embrace at least about 40% of the outer surface of the transportation unit **11**, preferably more than about 50 % of this outer surface. Because the heat transfer surface of the heating system embraces the outer surface of the transportation unit **11** by more than about 40%, the foodstuffs in the transportation unit **11** can be heated relatively quick in a relatively homogeneous and gradual way. Due to the quick heating without the presence of a large temperature gradient within the transportation unit **11**, foodstuff removal can be performed within a limited period of time without loss of quality due to excessive heating.

Heating can be performed in a conventional way, for example by electrical heating using wires, by heat exchange with a fluid at a suitably elevated temperature or by any other heating method known to a person skilled in the art.

A heating apparatus **1** as shown in FIGS. 1A, 1B enables an efficient removal of foodstuffs out of a transportation unit **11**. The housing may be open at the top to allow for easy placement of the transportation unit **11** in the apparatus **1**, for example by using a forklift truck.

The heating apparatus **1** may further comprise a lid **13** that may be placed on top of the housing to form a top wall substantially covering the housing. The presence of a lid substantially covering the housing during heating improves the heating characteristics of the heating system **1** as the lid **13** blocks heat so that less heat can "escape" and more heat can be used to reduce the viscosity of the foodstuffs in the transportation unit.

The lid **13** shown in FIGS. 1A, 1B is a removable lid. Alternatively, the lid may be arranged to pivot about one or more hinges between an open position and a closed position. While placing the transportation unit into the housing the lid **13** can be removed or can be stalled in an open position. After placement of the transportation unit, the lid **13** is then placed back on top of the housing or moved back towards a closed position respectively.

Preferably, the lid **13** comprises an insulating material to improve the heating characteristics of the heating apparatus **1** even further. Suitable insulating materials

include glass fiber and rock wool. Rock wool is particularly suitable because it is robust enough to withstand accidentally applied forces.

In some embodiments, the lid **13** comprises a transparent portion for allowing an operator to check how the heating process is progressing and/or to see whether the heating apparatus is occupied or not.

At least one of the bottom **3** and side walls **5** may comprise insulating material. In some embodiments, one or more panels **9** comprise inside and outside cover plates made of a metal, e.g. steel, with a space there between that is filled with insulating material. The use of insulation material ensures that more heat generated by the heating system remains within the heating apparatus, and can thus be used to reduce the viscosity of the foodstuffs in the transportation unit. Suitable insulating materials include glass fiber and rock wool. Rock wool is particularly suitable because it is robust enough to withstand accidentally applied forces.

FIG. 2A schematically shows an embodiment of a heating system **21** that may be used in the heating apparatus **1**. The heating system **21** of FIG. 2A comprises the heat transfer surface includes the outer surface of tubes arranged for carrying a fluid at an elevated temperature. The fluid may be a heated liquid, such as heated water or heated oil, a heated gas, such as heated air, but may also be a combination of these two, for example heated steam. The tubes may be arranged to form a frame **23** for supporting the transportation unit **11**. The frame **23** facilitates a relatively direct heat connection between the outer surface of the transportation unit **11** and the heat transfer surface of the heating system **21**, which improves the heat transfer characteristics of the heating apparatus.

FIG. 2B schematically shows another heating system **25** that may be used in a heating apparatus. In this heating system, a heating surface **27** is shaped in substantially the form of a lower portion of the transportation unit **11**. Such shaped heating surface may comprise panels, such as the panels **7** discussed with reference to FIGS. 1A, 1B.

FIG. 3 schematically shows a lid **31** that may be used in embodiments of the heating apparatus. In contrast to the lid **13** discussed with reference to FIGS. 1A, 1B, the lid **31** may pivot about one or more hinges **32**. In addition, instead of using a transparent window, the lid **31** may be provided with a lid portion **33** that can be removable (not

shown) or may pivot about one or more hinges **34**. The use of a lid portion **33** may enable an operator to make corrections while a progress check is made.

Instead of using a lid covering the housing, the housing may comprise a top wall provided with a smaller lid similar to the lid portion **33** shown in FIG. 3. The use of such a smaller lid that only covers a portion of the housing instead of a lid that covers the entire housing has the advantage that a smaller structure with less weight needs to be moved during operation of the heating apparatus **1**, which saves energy and makes the apparatus **1** easier to control.

The transportation unit **11** takes the form of a bag. The bag may be any bag that fits into the heating apparatus. In the field of food stuffs, the size of the bag is preferably capable of transporting large quantities of foodstuffs, typically more than 2000 kg. In the case of glucose transport a bag can carry about 4000 kg, which would correspond with about 2800 l of glucose.

In embodiments of the invention, the transportation unit comprises two bags, i.e. a first bag or outer bag, and a second bag or inner bag. The inner bag is arranged to fit into the outer bag. The inner bag and the outer bag are sufficiently flexible to allow deformation that allows good contact with the heating surface of the heating system within the heating apparatus. Further details with respect to a preferred embodiment of the outer bag and the inner bag will be discussed with reference to FIGS. 4 and 5 respectively.

FIG. 4 schematically shows an embodiment of an outer bag **41**. The outer bag **41** has an upper side **42a** and a bottom side **42b**. The outer bag **41** further comprises one or more hoist bands **43**, in the shown embodiment two hoist bands, wrapped around the bottom side **42b** of the outer bag **41** and connected thereto. The upper side **42a** of the outer bag **41** may further comprise a closeable opening **47** for allowing insertion of the inner bag (not shown). Additionally, the outer bag **41** may be provided with an opening **45** to facilitate removal of the foodstuffs. In addition to such an opening, the outer bag **41** may further comprise a coupling unit for coupling the opening **45** to an appropriate opening of the inner bag to facilitate transfer of foodstuffs there through.

Although the transfer opening **45** in FIG. 4 is drawn at a height in the middle between the upper side **42a** and the bottom side **42b**, its position may be elsewhere as well. In many embodiments, the opening **45** is located close to the bottom side **42b**.

Removal of foodstuffs may be easier when the opening is at such low position, because gravitational forces may support a flow towards the opening **45** during removal. In some embodiments, the opening may be located at the bottom side **42b** of the outer bag **41**. In such cases, the opening is preferably suitable covered to reduce the risk of damage.

The outer bag **41** is preferably large in size to facilitate transport of the large quantities of foodstuffs referred to above. Exemplary dimensions of the outer bag are a length of about 2-2.4 m, a width of about 1.2-1.4 mm, and a height of about 1.2-1.4 m. However, other dimensions may be used as well. The use of a bag with a length that is greater than the height provides a transportation unit that is stable, and can be handled relatively easy. In addition, bags with these dimensions can fit easily in a standard container that would have a length of about 6 m, a width of about 2.2 m and a height of about 2.35 m. Using a forklift truck, while using additional lifting equipment when needed, six bags with suitable dimensions could be placed in such a container in an arrangement as schematically shown in FIG. 8.

The outer bag **41** is made from a woven fabric, preferably a woven polymer, to give the outer bag sufficient strength. A suitable fabric is a woven polymer comprising poly-propylene, preferably cold-drawn poly-propylene. Woven polymers such as cold-drawn poly-propylene may have a tensile strength greater than about 170 kN/m, which is sufficient to withstand forces exerted 4000 kg of glucose syrup. In some embodiments, the tensile strength of the woven fabric is greater than about 200 kN/m. Such tensile strength may in particular be desirable in case the transportation unit is designed to be reusable.

The bottom side **42b** of the outer bag may be strengthened, for example by placement of an additional strengthening layer. Such strengthening layer may comprise a felt material, preferably a needle felt material. The additional strengthening layer reduces the chance that the transportation unit, in particular the inner bag, is damaged by sharp objects, which could lead to loss of foodstuffs and/or contamination of the surroundings.

The hoist bands **43** form loops above the upper side **42a** of the outer bag **41**. The hoist bands **43** may be connected to the first bag by stitching. The yarn used for the stitching may comprise polypropylene with a tensile strength greater than about 5 grams per denier. Such tensile strength is sufficient to withstand forces exerted by large masses of foodstuffs. Preferably, the tensile strength is greater than about 6

grams per denier. Such tensile strength may in particular be desirable in case the transportation unit is designed to be reusable.

As mentioned above, the upper side **42b** of the outer bag **41** may be provided with a closeable opening **47** to allow easy entry of the inner bag into the outer bag and vice versa. The closeable opening **47** may take the form of a foldable flap. In some further embodiments, the flap may be provided with Velcro to avoid contamination by outside influences while ensuring that the flap can easily be folded, even under wet conditions.

In a particular embodiment, the outer bag **41** comprises at least five elements that are connected to each other, for example by stitching. The five elements include a first side element, a second side element, a middle element for connecting the first side element and the second side element, and the two hoist bands **43**. The middle element and the end elements may be made of a heavy duty polypropylene fiber. The hoist bands **43** may be made of polyester. The first side element and the second side element are very similar with the exception that the first side element may comprise the opening **45** for transfer of foodstuffs as described above.

FIG. 5 schematically shows an embodiment of an inner bag **51** that may be used in some embodiments of the invention. The inner bag **51** comprises a first controllable opening **53** for filling the bag with foodstuffs. The inner bag **51** shown in FIG. 5 further comprises a second controllable opening **55** for facilitating removal of foodstuffs. Alternatively, removal of foodstuffs may be performed via the first inner opening **53** used. In the latter case, the opening **53** will generally be greater in size. Both openings **53, 55** may be provided with a valve to enable control of the insertion and/or removal of foodstuffs into and/or out of the bag **51** respectively. The openings **53, 55** are typically about circular in shape with a diameter of about 5-10 cm.

In addition, as shown in FIG. 5, the inner bag **51** may further comprise yet another controllable opening **57** at the upper side of the inner bag **51** to allow for pressure control within the inner bag **51**. The pressure control opening **57** may be used to inflate the inner bag **51** after insertion into the outer bag **41**, but before filling starts. The inflation via the pressure control opening **57** then allows the inner bag to suitably fit into the outer bag **41**. In addition, the pressure control opening may be used during removal of the foodstuffs via opening **55**. By providing a pressure via the

opening into the inner bag **51** during removal of the foodstuffs while the first controllable opening **53** is closed the foodstuffs can be pushed out at a faster pace.

The inner bag **51** is to be placed in an appropriate outer bag, for example the outer bag **41** of FIG. 4. Preferably, the inner bag **51** has somewhat greater dimensions than the outer bag **41**, while it is generally approximately similar in shape. The use of a slightly greater inner bag **51** helps to reduce pressure on the inner bag **51**.

The inner bag **51** is to be filled with the foodstuffs, preferably about 2000 – 5000 kg. A typical volume for the inner bag **51** in the field of glucose transport would be such that it can accommodate about 4000 kg of glucose syrup.

The inner bag **51** serves as the liner of the transportation unit. The inner bag **51** is made of a material that is liquid impermeable to avoid leakage. A suitable material is polyethylene (PE), and in particular low density PE having a density in the range of about 0.90 to about 0.95 g/cm$^3$. Besides being relatively low in price, PE is very suitable for use in foodstuff applications because it is non-toxic and does not influence smell and/or taste of the foodstuffs. Furthermore, PE can be used at temperatures between about -20 °C and about 95 °C.

The inner bag **51** may be manufactured by known techniques including but not limited to thermo welding and blow molding.

FIGS. 6A-6C schematically show different positions of a valve that is part of an inner bag **51** according to an embodiment of the invention. Such valve may be used to control the extent to which material can be inserted into and/or removed from the inner bag **51**, for example through openings **53** and/or **55** in FIG. 5.

As shown in FIGS. 6A, 6B the valve may be a so-called butterfly valve. A butterfly valve is relatively flat which may be in a closed position (FIG. 6A) or in an open position (FIG. 6B).The valve may be covered with a cap **61** for protection purposes, for example during transport of a filled inner bag outside the outer bag. The valve may comprise a valve housing and a valve element.

The valve housing may comprise a connection element **61** for connecting a transfer element for insertion and/or removal of foodstuff into and/or our of the inner bag. The connection element may comprise a thread portion. Such thread portion may be used for connecting to the transfer element and/or may be used to place the cap **69** on the valve as shown in FIG. 6C. The housing may further comprise a flange **63** for

providing a tight connection with the transfer element so as to avoid leakage during transfer of foodstuffs.

The valve element may comprise a main element **65** that in a closed position effectively closes the opening in the inner bag. The valve element may further comprise one or more levers **67** to allow manipulation of the orientation of the main element **65**, for example from a closed position as schematically shown in FIG. 6A towards a completely open position as schematically shown in FIG. 6B.

The heating apparatus may be connected to a pump to form a foodstuffs removal assembly. One or more tubes may be connected to the pump for transferring the foodstuffs by means of the pump from the transportation unit towards a further storage unit. The pump may be a mobile pump of limited size, for example a pump with a pump capacity below about 10 $m^3$/hour, or even below about 5 $m^3$/hour. Experiments have shown that such a pump can empty a container filled with Glucose syrup having a temperature of about 60 °C, density of about 1390 kg/ $m^3$ and viscosity of about 1000 centipoise without substantial difficulty. In case of higher viscosities, the pump capacity may reduce.

Preferably, the pump is a positive pump. In such case the transportation unit should be place at a higher altitude than the pump to obtain an efficient pumping operation. The pump may be cleanable with water, and its housing may be self-draining.

A block diagram of a method of removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit with such removal assembly is schematically shown in FIG. 7.

First a transportation unit filled with the foodstuffs to be removed is placed in the housing of the heating apparatus, for example by using a fork lift truck. The pump within the removal assembly may then be connected with an opening in the transportation unit, so as to enable the removal of foodstuffs by pumping. The foodstuffs in the transportation unit may then be heated for sufficient time to lower the viscosity of the foodstuffs, at least up to a temperature level at which the viscosity of the foodstuffs is low enough to allow pumping in a relatively efficient way. Heating may be performed with predetermined settings, for example the heating time and/or the heating temperature may be predetermined. Instead of predetermined

settings, the temperature of the foodstuffs may be monitored, for example by performing intermediate temperature measurements. If the temperature measurements indicate the temperature of the foodstuffs is sufficiently high to start pumping, heating may be terminated. Temperature measurements may be obtained by one or more temperature sensors suitably placed within the heating apparatus and/or the transportation unit. For example, a temperature sensor may be placed in the interior of a cap covering an opening of the inner bag, such as cap **69** in FIG. 6C.

Although connecting the transportation unit to the pump is described to occur prior to heating, these actions may be reversed as is demonstrated by the dashed arrows in FIG. 7.

If the foodstuffs are at a sufficiently high temperature, it can be removed from the transportation unit by pumping.

After emptying the transportation unit, the transportation unit may be removed from the heating apparatus, and may be cleaned or otherwise prepared for recycle purposes.

Abovementioned process is a closed circuit process. Such process has the advantage that the foodstuffs are not in contact with open air during transfer, which maintains the quality of the foodstuffs. In comparison, foodstuffs being transported in drums or the like do contact open air during transfer which may degrade the quality of the foodstuffs.

Additionally abovementioned process can be executed within a limited period of time as compared to processes that are used today for the heating of so-called flexibags.

Throughout the description the expression "highly viscous" has been used. This expression refers to a viscosity greater than about 1 Pas at 25 °C.

The invention has been described by reference to certain embodiments discussed above. It should be noted various constructions and alternatives have been described, which may be used with any of the embodiments described herein, as would be know by those of skill in the art. Furthermore, it will be recognized that these embodiments are susceptible to various modifications and alternative forms well known to those of skill in the art without departing from the spirit and scope of the invention. Accordingly, although specific embodiments have been described, these are examples

only and are not limiting upon the scope of the invention, which is defined in the accompanying claims.

**Conclusies**

1. Inrichting voor het verwarmen van levensmiddelen die hoogviskeus of vast zijn bij kamertemperatuur, waarbij de inrichting omvat:

- een behuizing met een bodemwand en zijwanden, waarbij de behuizing is ingericht om een transporteereenheid die gevuld is met meer dan 2000 kg levensmiddel te accommoderen en voorzien is van een opening voor het verwijderen van het levensmiddel, waarbij de behuizing verder voorzien is van een uitlaatopening; en
- een verwarmingsysteem binnen de behuizing welke is voorzien van een warmteoverdrachtoppervlak voor het overdragen van warmte aan de transporteereenheid bij gebruik, waarbij het warmteoverdrachtoppervlak van het verwarmingsysteem is ingericht om ten minste ongeveer 40% van het buitenoppervlak van de transporteereenheid te omhullen.

2. Inrichting volgens conclusie 1, waarbij het warmteoverdrachtoppervlak het buitenoppervlak van buizen, platen of panelen omvat.

3. Inrichting volgens conclusie 2, waarbij de buizen, platen of panelen een frame vormen voor het ondersteunen van de transporteereenheid.

4. Inrichting volgens conclusie 1, waarbij het warmteoverdrachtoppervlak het buitenoppervlak van panelen omvat, en waarbij ten minste één van de oppervlakken van de warmtepanelen die gericht naar een ruimte binnen de behuizing voor het accommoderen van de transporteereenheid gedurende gebruik een veelheid van noppen omvat.

5. Inrichting volgens eenieder van de voorgaande conclusies, verder omvattende een verwijderbare deksel die, indien aanwezig, een bovenliggende wand vormt die de behuizing in wezen bedekt.

6. Inrichting volgens eenieder van conclusies 1 – 4, verder omvattende een deksel verbonden met één van de zijwanden via één of meer scharnieren, waarbij de deksel pivoteerbaar is rondom de één of meer scharnieren teneinde, indien gesloten, een bovenliggende wand te vormen die de behuizing in wezen bedekt.

7. Inrichting volgens conclusie 5 of 6, waarbij de deksel is voorzien van een transparant gedeelte.

8. Inrichting volgens eenieder van conclusies 1 – 4, waarbij de behuizing verder een bovenliggende wand omvat die is voorzien van een dekselgedeelte, waarbij het dekselgedeelte ofwel verwijderbaar is ofwel pivoteerbaar is rondom één of meer scharnieren.

9. Inrichting volgens eenieder van de voorgaande conclusies, waarbij ten minste één van de zijwanden en de bodemwand isolerend materiaal omvat.

10. Inrichting volgens eenieder van de voorgaande conclusies, verder omvattende een levensmiddelen-overbrengeenheid met een eerste uiteinde en een tweede uiteinde, waarbij het eerste uiteinde is ingericht voor verbinding met de opening van de transporteereenheid en het tweede uiteinde is ingericht voor verbinding met de uitlaatopening van de behuizing.

12. Systeem voor het verwijderen van levensmiddelen die hoogviskeus of vast zijn bij kamertemperatuur uit een transporteereenheid, waarbij het systeem omvat:

- een verwarmingsinrichting volgens eenieder van conclusies 1 – 10;
- een pomp ingericht voor het pompen van levensmiddelen uit een transporteereenheid die in de verwarmingsinrichting is geplaatst; en
- één of meer buizen voor het overbrengen van de levensmiddelen uit de transporteenheid naar een verdere opslageenheid door middel van de pomp.

13. Systeem volgens conclusie 12, waarbij de verwarmingsinrichting een transporteereenheid accommodeert, waarbij de transporteereenheid omvat:

- een eerste zak gemaakt van geweven materiaal, bij voorkeur een geweven polymeer, waarbij de eerste zak een bovenzijde en een onderzijde heeft, en waarbij de eerste zak is ingericht voor het accommoderen van een tweede zak;
- een tweede zak aangepast om te passen in de eerste zak, waarbij de tweede zak een opening omvat voor het invoeren en verwijderen van levensmiddelen; en

- één of meer hijsbanden gewikkeld rondom de onderzijde van de eerste zak en daarmee verbonden, waarbij de één of meer hijsbanden lussen boven de bovenzijde van de eerste zak vormen;

waarbij de eerste zak een overdrachtsopening omvat voor het verwijderen van de levensmiddelen uit de transporteereenheid.

14. Werkwijze voor het verwijderen van levenmiddelen die hoogviskeus of vast zijn bij kamertemperatuur uit een transporteereenheid, waarbij de werkwijze omvat:

- verschaffen van een inrichting voor het verwarmen van levensmiddelen, waarbij de inrichting een behuizing en een verwarmingssysteem binnen de behuizing omvat, waarbij de behuizing een onderwand en zijwanden heeft en is ingericht voor het accommoderen van een transporteereenheid gevuld met meer dan 2000 kg levensmiddel en voorzien van een opening voor verwijdering van het levensmiddel, en waarbij het verwarmingssysteem is voorzien van een warmteoverdrachtoppervlak voor het overdragen van warmte aan de transporteereenheid bij gebruik;
- verschaffen van een pomp;
- plaatsen van een transporteereenheid gevuld met levensmiddelen en verschaft met een opening voor verwijdering van de levensmiddelen in de behuizing van de verwarmingsinrichting;
- koppelen van de pomp aan de transporteereenheid;
- verwarmen van de levensmiddelen in de transporteereenheid; en
- verwijderen van de levensmiddelen uit de transporteereenheid door middel van pompen.

15. De werkwijze volgens conclusie 14, waarbij de behuizing is voorzien van een uitlaatopening en waarbij het koppelen omvat:

- verbinden van een overbrengbuis met de opening van de transporteereenheid door de uitlaatopening; en
- verbinden van de overbrengbuis met de pomp.

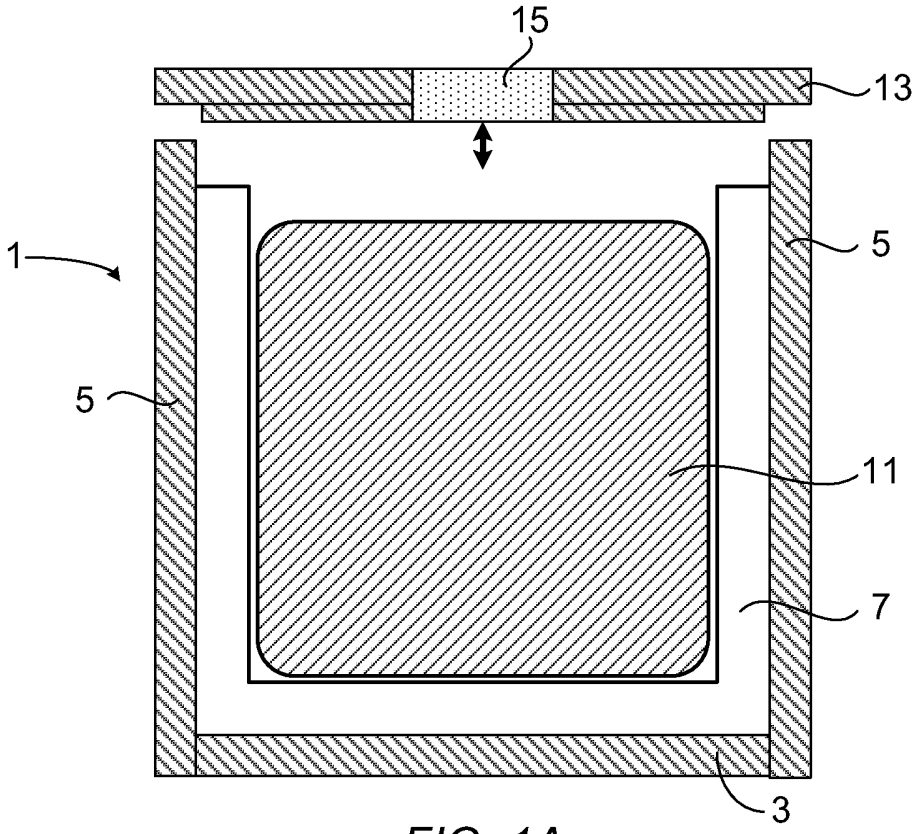



FIG. 1A

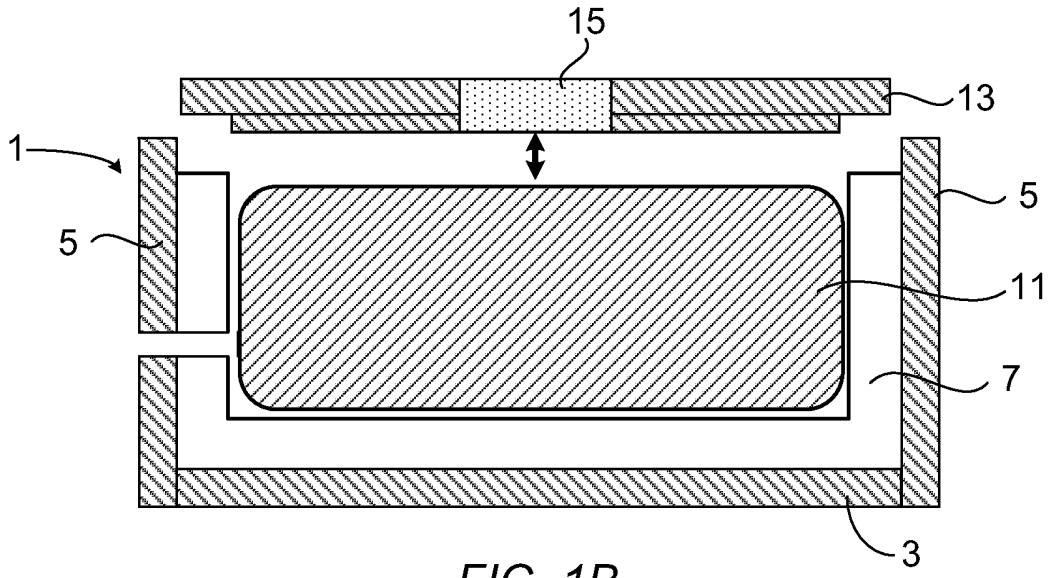



FIG. 1B

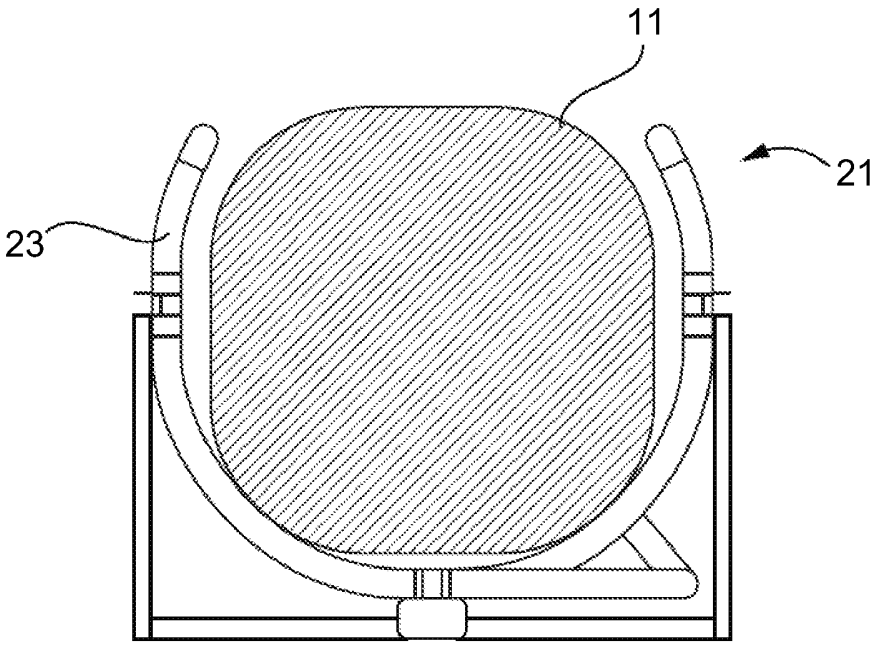



FIG. 2A

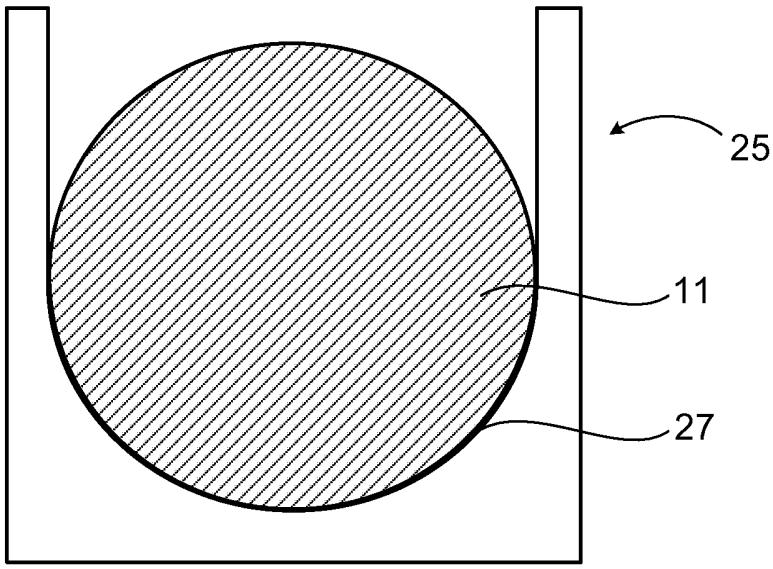



FIG. 2B

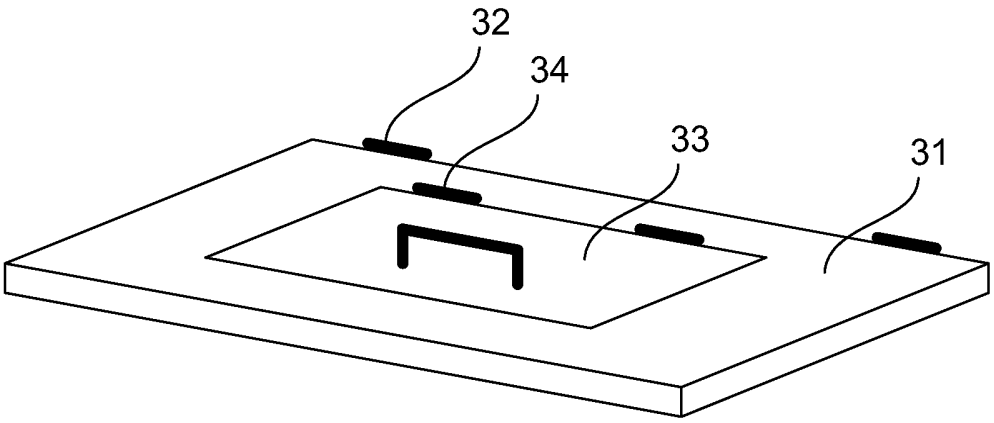



FIG. 3

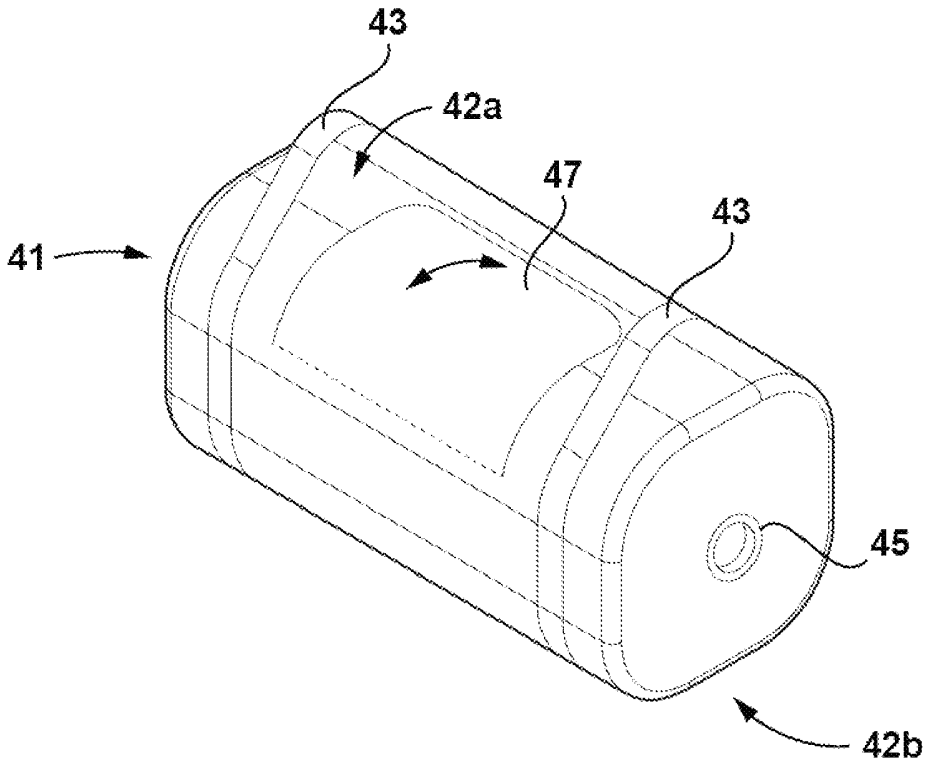



FIG. 4

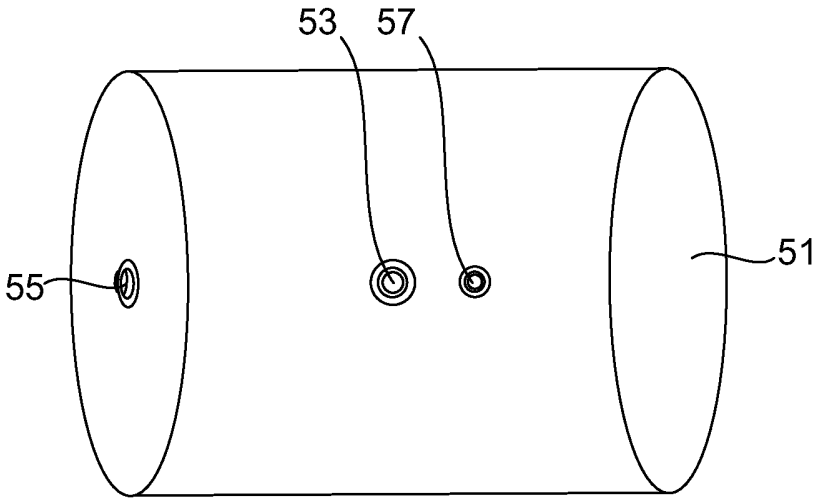



FIG. 5

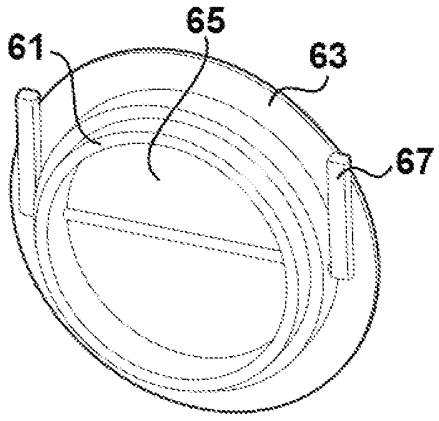



FIG. 6A

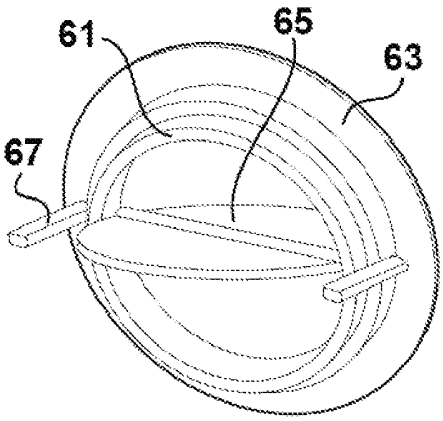



FIG. 6B

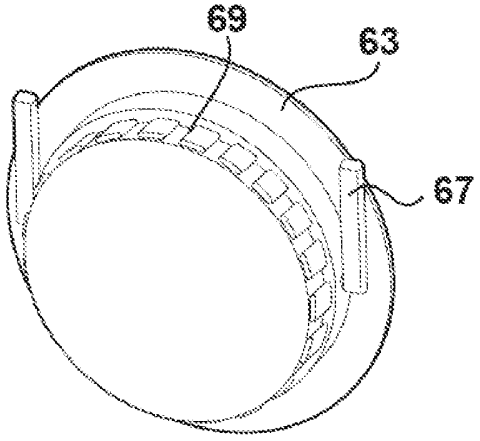



FIG. 6C

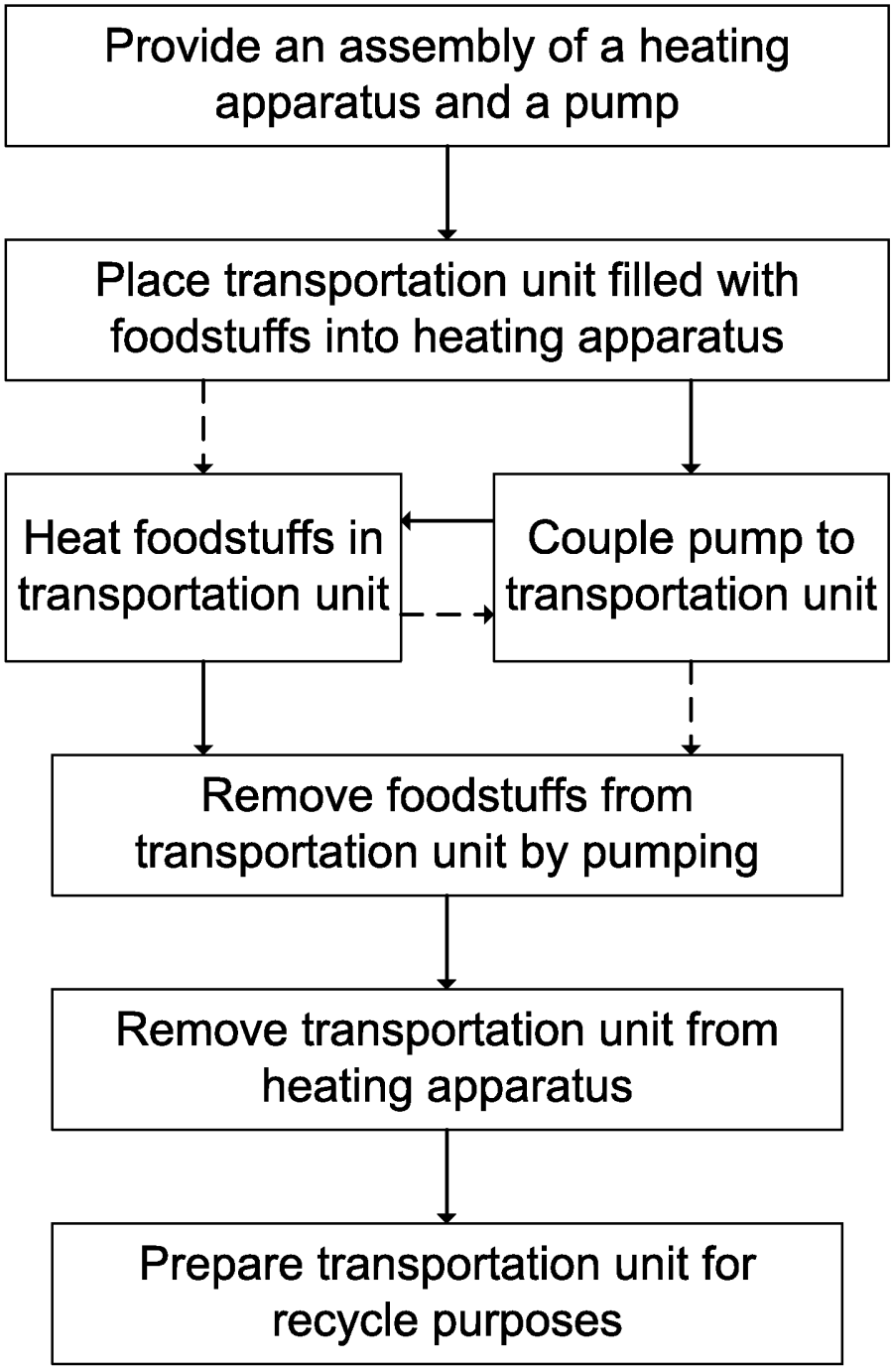

Provide an assembly of a heating apparatus and a pump
Place transportation unit filled with foodstuffs into heating apparatus
Heat foodstuffs in transportation unit
Couple pump to transportation unit
Remove foodstuffs from transportation unit by pumping
Remove transportation unit from heating apparatus
Prepare transportation unit for recycle purposes

*FIG. 7*

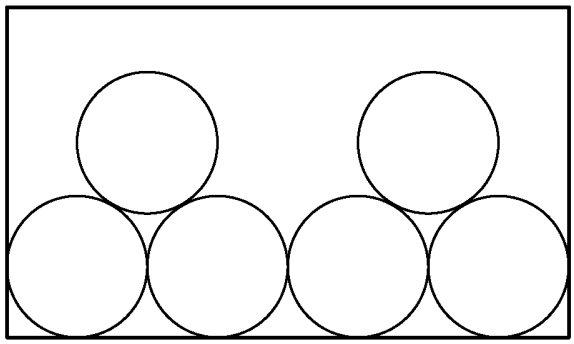


*FIG. 8*

# SAMENWERKINGSVERDRAG (PCT)

## RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

| IDENTIFICATIE VAN DE NATIONALE AANVRAGE | KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE |
|---|---|
| | **20981000200NL00** |
| Nederlands aanvraag nr.<br>**2005604** | Indieningsdatum<br>**29-10-2010** |
| | Ingeroepen voorrangsdatum |
| Aanvrager (Naam)<br>**The Ingredients Company B.V.** | |
| Datum van het verzoek voor een onderzoek van internationaal type<br>**26-02-2011** | Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.<br>**SN 55709** |

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

Volgens de internationale classificatie (IPC)

**B67D7/80** **B67D7/82** **B65D88/74**

**II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK**

Onderzochte minimumdocumentatie

| Classificatiesysteem | Classificatiesymbolen |
|---|---|
| **IPC8** | **B67D** **B65D** **B65B** **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. | X | **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 2005604

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B67D7/80 B67D7/82 B65D88/74
ADD. B65B69/00

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)
B67D B65D B65B A47J

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

C. VAN BELANG GEACHTE DOCUMENTEN

| Categorie ° | Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages | Van belang voor conclusie nr. |
|---|---|---|
| | EENHEID VAN UITVINDING ONTBREEKT<br>zie aanvullingsblad B<br>----- | |
| X | US 5 803 317 A (WHEELER JAMES R [US])<br>8 september 1998 (1998-09-08)<br><br>* kolom 1, regels 19-25; figuren 1-10 *<br>* kolom 3, regels 19-20 *<br>* kolom 4, regels 12-24, 34-38 *<br>* kolom 5, regels 45-48 *<br>* kolom 6, regels 9-37, 57-60 *<br>----- | 1-5,<br>7-10,<br>22-25 |
| X | US 6 016 935 A (HUEGERICH MICHAEL LEE [US] ET AL) 25 januari 2000 (2000-01-25)<br>* kolom 4, regel 54 - kolom 5, regel 20; figuren 1-15 *<br>* kolom 6, regels 28-32 *<br>----- | 1-3,6,8,<br>10,22-25 |
| | -/-- | |

[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] 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 |
|---|---|
| 20 juni 2011 | |
| **Naam en adres van de instantie**<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040,<br>Fax: (+31–70) 340–3016 | **De bevoegde ambtenaar**<br>Garlati, Timea |

2

Formulier PCT/ISA/201 (tweede blad) (Januari 2004)

**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 2005604

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

| Categorie ° | Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages | Van belang voor conclusie nr. |
|---|---|---|
| X | US 3 945 534 A (ADY ESTHMEL W)<br>23 maart 1976 (1976-03-23)<br>* kolom 1, regels 61-65; figuren 1-5 *<br>* kolom 2, regels 52-53 *<br>* kolom 3, regels 23-30 *<br>* kolom 4, regels 5-14, 54-61 *<br>* kolom 6, regels 1-5 * | 1-3,5,8,<br>10 |
| X | US 2003/089740 A1 (GUTIERREZ J ANTONIO [US] ET AL) 15 mei 2003 (2003-05-15)<br>* alineas [0067] - [0070], [0 72], [0 77], [0079]; figuren 1-10 * | 1-3,10,<br>22-25 |
| X | WO 99/00322 A1 (NELSON CHARLES M [US])<br>7 januari 1999 (1999-01-07)<br>* bladzijde 5, regels 12-19, 26-30 *<br>* bladzijde 6, regels 22-25 *<br>* bladzijde 7, regels 13-14, 25-30; figuren 1-4 * | 1,2,9,<br>22,23 |
| X | US 2007/116811 A1 (ROSE J M [US] ET AL ROSE J MICHAEL [US] ET AL)<br>24 mei 2007 (2007-05-24)<br>* samenvatting * | 1 |



Formulier PCT/ISA/201 (vervolg tweede blad) (Januari 2004)

## GEBREK AAN EENHEID VAN UITVINDING

Octrooiaanvrage Nr.:
SN 55709
NL 2005604

## AANVULLINGSBLAD B

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

1. conclusies: 1-10, 22-25

   An apparatus and a method for heating foodstuffs that are highly viscous.

   ---

2. conclusies: 11-21

   A transportation unit for foodstuffs that are highly viscous.

   ---

Het vooronderzoek werd tot het eerste onderwerp beperkt.

The present application relates to several inventions or groups of inventions which are not so linked as to form a single general inventive concept and therefore do not comply with the requirements of unity.
The only features specifically common to independent claims 1 and 11 is a transportation unit for viscous products. This feature is well known form the prior art see for instance document D1 (US 5803317), Fig 1 and therefore not be considered as a special technical feature.
The problem to be solved by the first invention is to provide a means for heating the transportation unit. The features which solve this problem is the housing with the heating system of claim 1.
The problem to be solved by the second invention is to provide means for controlling the pressure in the transportation unit. The feature which solves this problem is the first bag arranged around the second bag as defined in claim 11.
Since the problems to be solved by the two inventions and the features which solve these problems are different, the different technical features cannot be considered to be corresponding special technical features.

**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 2005604

| In het rapport genoemd octrooigeschrift | Datum van publicatie | Overeenkomend(e) geschrift(en) | Datum van publicatie |
|---|---|---|---|
| US 5803317 A | 08-09-1998 | GEEN | |
| US 6016935 A | 25-01-2000 | GEEN | |
| US 3945534 A | 23-03-1976 | GEEN | |
| US 2003089740 A1 | 15-05-2003 | GEEN | |
| WO 9900322 A1 | 07-01-1999 | AU 737845 B2 | 30-08-2001 |
| | | AU 7966798 A | 19-01-1999 |
| | | BR 9815531 A | 10-10-2000 |
| | | CN 1268097 A | 27-09-2000 |
| | | DE 69822502 D1 | 22-04-2004 |
| | | DE 69822502 T2 | 24-02-2005 |
| | | EP 1037824 A1 | 27-09-2000 |
| | | US 5884814 A | 23-03-1999 |
| US 2007116811 A1 | 24-05-2007 | GEEN | |

**OCTROOICENTRUM NEDERLAND**

# WRITTEN OPINION

| File No. | Filing date *(day/month/year)* | Priority date *(day/month/year)* | Application No. |
|---|---|---|---|
| SN55709 | 29.10.2010 | | NL2005604 |

International Patent Classification (IPC)
INV. B67D7/80 B67D7/82 B65D88/74 ADD. B65B69/00

Applicant
The Ingredients Company 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 |
|---|---|
| | |

Application number

# WRITTEN OPINION

NL2005604

## 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

## 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. 11-21

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. 11-21

☐ 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

**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 | 4, 7 |
| | No: | Claims | 1-3, 5, 6, 8-10, 22-25 |
| Inventive step | Yes: | Claims | |
| | No: | Claims | 1-10, 22-25 |
| Industrial applicability | Yes: | Claims | 1-10, 22-25 |
| | No: | Claims | |

2. Citations and explanations

**see separate sheet**

## Re Item IV

The present application relates to several inventions or groups of inventions which are not so linked as to form a single general inventive concept and therefore do not comply with the requirements of unity.

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

1. Claims: 1-10, 22-25

   An apparatus and a method for heating foodstuffs that are highly viscous.

2. Claims: 11-21

   A transportation unit for foodstuffs that are highly viscous.

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

The only features specifically common to independent claims 1 and 11 is a transportation unit for viscous products. This feature is well known form the prior art see for instance document D1 (US 5803317), Fig 1 and therefore not be considered as a special technical feature.

The problem to be solved by the first invention is to provide a means for heating the transportation unit. The features which solve this problem is the housing with the heating system of claim 1.

The problem to be solved by the second invention is to provide means for controlling the pressure in the transportation unit. The feature which solves this problem is the first bag arranged around the second bag as defined in claim 11.

Since the problems to be solved by the two inventions and the features which solve these problems are different, the different technical features cannot be considered to be corresponding special technical features.

## Re Item V

Reference is made to the following documents:

D1 US 5 803 317 A (WHEELER JAMES R [US]) 8 september 1998 (1998-09-08)

D2 US 6 016 935 A (HUEGERICH MICHAEL LEE [US] ET AL) 25 januari 2000 (2000-01-25)

D3 US 3 945 534 A (ADY ESTHMEL W) 23 maart 1976 (1976-03-23)

D4 US 2003/089740 A1 (GUTIERREZ J ANTONIO [US] ET AL) 15 mei 2003 (2003-05-15)

D5 WO 99/00322 A1 (NELSON CHARLES M [US]) 7 januari 1999 (1999-01-07)

D6 US 2007/116811 A1 (ROSE J M [US] ET AL ROSE J MICHAEL [US] ET AL) 24 mei 2007 (2007-05-24)

The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new. The documents listed above represent merely a selection of the prior art pertinent to the subject-matter of claim 1. Reference is made to the document D1, which discloses:

An apparatus for heating foodstuffs that are highly viscous or solid at ambient temperatures (column 1, lines 19-24), the apparatus comprising:

- a housing (Fig 4, 60) having a bottom wall (Fig 4, 63) and side walls (Fig 4, 58, 59, 62), the housing (Fig 4, 60) being arranged to accommodate a transportation unit (Fig 1, 12) filled with the foodstuff and provided with an opening (Fig 1, 22) for removal of the foodstuff, the housing further comprising an outlet opening (Fig 4, 64); and

- a heating system (Fig 7, 70) within the housing provided with a heat transfer surface (Fig 4, 58, 59, 62, 63) for transferring heat to the transportation unit (Fig 1, 12) during use (column 6, lines 21-37), wherein the heat transfer surface of the heating system is arranged to embrace at least about 40% of the outer surface of the transportation unit (Fig 1, 12).

Since the bottom and side walls of D1 cover more than 40% of the flexible pouch the subject-matter of claim 1 is not novel.

The subject-matter of claim 1 is also known from each of the documents D2, D3, D4, D5 and D6.

The additional subject-matter of dependent claims 2, 3, 5, 8, 9, 10, 22 and 23 is also known from at least document D1, while the additional subject-matter of dependent claims 6 is not novel in view of D2 (column 6, lines 28-32).

The provision of burls on the surface of the housing (to enhance heat transfer) or the provision of a transparent portion on the lid (for better supervision) cannot be considered to require an inventive effort on behalf of the skilled person, because he would regard it a normal design procedure to combine all the features set out in claims 4 and 7 to solve the problems posed.

With respect to independent claim 24, reference is made to document D1, disclosing:

A method of removing foodstuffs that are highly viscous or solid at ambient temperatures from a transportation unit, the method comprising:

-providing an apparatus for heating foodstuffs, the apparatus comprising a housing (Fig 4, 60) and a heating system (Fig 7, 70) within the housing, wherein the housing has a bottom wall (Fig 4, 63) and side walls (Fig 4, 58, 59, 62), and is arranged to accommodate a transportation unit (Fig 1, 12) filed with the foodstuff and provided with an opening (Fig 1, 22) for removal of the foodstuff, and wherein the heating system (Fig 7, 70) is provided with a heat transfer surface (Fig 4, 58, 59, 62, 63) for transferring heat to the transportation unit during use (column 6, lines 21-37);

- providing a pump (Fig 4, 78);

- placing a transportation unit (Fig 1, 12) filled with the foodstuffs and provided with an opening for removal of the foodstuffs into the housing of the heating apparatus (column 5, lines 62-63);

- coupling the pump to the transportation unit (column 6, lines 57-60);

- heating the foodstuffs in the transportation unit (column 6, lines 21-23); and

- removing the foodstuffs from the transportation unit by pumping (column 8, lines 36-41).

The subject-matter of claim 24 is thus not novel.

The transfer tube of claim 25 is also known from document D1 (Fig 2, 30).