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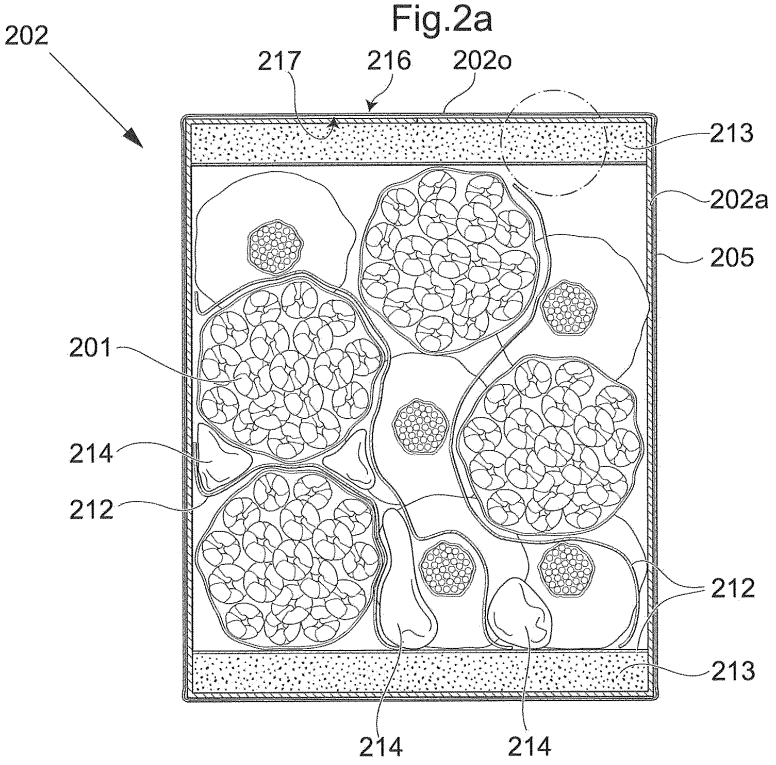
(54) **Cut flower transportation**

(57) A shipping method for shipping cut flowers (101,201). The shipping method comprises packaging (a) the flowers in a box (102,202) for shipping, vacuum cooling (b) the box and flowers to a temperature in the range 1°C - 10°C, applying (c) a flexible sheet material (105,205) onto the box (102,202) for shipping. The flexible sheet material (102,202) comprises a first reflective surface (216) facing away from the box (102,202) when applied, for reflecting infrared radiation (IR), wherein a second surface (217,313), being less reflective than the first surface (216,316) is facing the inside of the box, for absorbing infrared radiation (IR).

Fig.2a



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Description

Technical field

[0001] The present invention relates to the field transportation of fresh cut flowers.

Background

[0002] A fresh cut flower is a living organism and thus metabolically active. The cut flower is therefore subject to the same physiological processes as any plant. A cut flower is constantly growing and developing, and thus aging and thereby deteriorating. The aging of a flower is related to its environment, and the temperature of the environment is the most prominent factor affecting the deterioration rate of the flower. The temperature affects the flower's respiration, which is the process in which the cell metabolites of the flower are oxidized and electrons are transferred through a series of carriers to oxygen. Water and carbon dioxide is formed and the energy, released in several steps, is transduced into ATP. The process of respiration further generates heat in the flower.

[0003] As the respiration of the flower is affected by the temperature of its environment, the flower ages at lower pace at lower temperatures, which means that a flower may remain in bloom longer in a cold environments than it would in a warmer environment. On average, the aging process occur between two and four times faster if the temperature is increased by 10°C and two to four times more slowly if it is reduced by the same amount.

[0004] Another factor affecting the aging of the flower is the presence of ethylene in the environment of the flower. Ethylene causes cellular senescence and abscission and further induces changes in the permeability of the cell membranes. However, the damaging effects of the ethylene is dependent on the temperature, i.e. as temperature increases, less ethylene is needed to cause damage. Keeping fresh flowers cool during transportation is thus essential for enabling transportation over larger distances.

[0005] Most flowers are furthermore very sensitive to frost, i.e. temperatures below 0°C. Frost creates sharp ice crystals in the cells of the flower, which damages and punctures the cell membranes. In most flowers, the creation of ice crystals in the cell irreparably harms the flower in a way which makes the flower impossible to use as decorative element.

[0006] In current shipping, flowers are placed in cardboard boxes or stacked in water filled buckets placed on pallets or in special transportation carts and shipped in cooled containers adapted for road, rail road, air or sea transportation. The cooled containers regularly vary substantially in temperature, as the cooling usually is performed by a cooler placed in one end of the container. The internal variation in temperature in the container may result in the flowers being exposed to temperatures above the optimal for flower transportation in one part of the container, causing the flowers to mature too fast, and temperatures below the optimal for flower transportation in other parts of the container, which creates risks that frost damages the flowers.

[0007] Apart from the variations in temperature within the container, the flowers often need to change container during the transportation, e.g. in the process of changing from air transport to road transport, or changing from a larger container to a smaller delivery vehicle, during which time the flowers may be exposed high or low temperatures and/or sunlight.

[0008] As the transportation conditions of different flowers in the same transport may vary substantially, it is not possible to say that all flowers in the same transport are in the same stage of development, i.e. that they have the same biological age. The biological age of a flower when it reaches the end consumer is probably the factor which is most considered to be synonymous with the quality of the flower, i.e. a flower that remain in full bloom many days after having reached the end consumer is regarded as a high quality flower, whereas a flower which withers rapidly is regarded as one of poor quality.

[0009] In light of the above, it would be advantageous to have an improved way of transporting flowers which increases the perceived quality of the flower to the end consumer.

Summary

[0010] A shipping method for shipping cut flowers is provided. The shipping method comprises packaging the flowers in a box for shipping, vacuum cooling the box and flowers to a temperature in the range 1°C - 10°C and applying a sheet material onto the box for shipping. The sheet material comprises a reflective surface facing away from the box when applied, for reflecting infrared radiation. A second surface which is less reflective than the first surface is facing the inside of the box when applied, for absorbing infrared radiation. The vacuum cooling rapidly slows the aging of the flowers and the box for shipping then maintains an environment in which the aging remains slow. Infrared radiation generated by the flowers is absorbed and transferred by the inside surface of the box at the same time as infrared radiation coming from external sources is reflected.

[0011] After the box for shipping has been wrapped in the flexible sheet material, the box may be shipped by conventional shipping methods.

[0012] According to one embodiment, the flexible sheet material is an impermeable flexible sheet material, which increases the insulating effect and may maintain a cleaner and less polluted environment inside the box, which further reduces the aging of the flowers.

[0013] The shipping method may further comprise the step of placing cooling elements inside the box. The cooling elements may be non-electric cooling elements, such as Hydoxyethyl Cellulose cooling elements.

[0014] According to one embodiment, the second less

reflective surface is a second surface of the flexible sheet material

[0015] According to one embodiment, the flexible sheet material comprises a polyethylene layer laminated with an aluminum layer. The polyethylene layer has a surface which is less reflective than the aluminum, and the polyethylene surface is thus placed facing the box for shipping, while the aluminum layer is placed facing outwards away from the box for shipping.

[0016] According to one embodiment, the shipping method further comprises fixating the flowers inside the box using polyurethane foam, and/or a silicone coated paper and/or glue. Fixing the flowers reduces the exchange of the environment inside of the box and also reduces the risk that the flowers are mechanically injured during shipping and handling.

[0017] According to one embodiment, the step of applying a flexible sheet material onto the box for shipping is performed before the flowers are packaged in the box.

[0018] According to one embodiment, the step of applying a flexible sheet material onto the box for shipping, comprises applying a flexible sheet material onto the box using an adhesive.

[0019] According to one embodiment, the shipping method further comprises the step of sealing the box.

[0020] A box for the shipping method of any one of the embodiments is further provided. The box comprises: box walls made from a rigid sheet material, and a flexible sheet material enclosing the walls. The flexible sheet material comprises a first reflective surface facing away from the box when applied, for reflecting infrared radiation, wherein a second surface, being less reflective than the first surface, is facing the inside of the box, for absorbing infrared radiation.

[0021] The flexible sheet material may comprise a first layer of aluminum comprising the reflective surface, and a second layer of polyethylene comprising the less reflective surface, and the second layer of polyethylene may comprise a layer of expanded polyethylene, which further assists in insulating the box for shipping. The flexible sheet material may be an impermeable flexible sheet material.

[0022] According to one embodiment, the first reflective surface has a reflectance value above 0,85 or above 0,90 such that 85% or 90% of the infrared radiation directed towards the box is reflected.

[0023] Please note that the embodiments described herein may be combined in any way unless clearly contradictory.

Brief description of drawings

[0024] The invention is now described, by way of example, with reference to the accompanying drawings, on which:

Fig. 1 shows an overview of the system for shipping flowers,

Fig. 2a shows a cross-sectional view of the box for shipping flowers, when the flowers are packaged therein, in accordance with one embodiment,

Fig. 2b shows an enlarged view of a portion of the wall of the box for shipping flowers,

Fig. 3a shows a perspective view of the box for shipping in accordance with a second embodiment,

Fig. 3b shows a perspective view of the box for shipping in accordance with the second embodiment, when closed and sealed,

Fig. 4 is a flow chart of a method of shipping flowers.

Detailed description

[0025] In the following, a detailed description of embodiments of the invention will be given with reference to the accompanying drawings. It will be appreciated that the drawings are for illustration only and are not in any way restricting the scope of the invention. Thus, any references to directions, such as "up" or "down", are only referring to the directions shown in the figures. It should be noted that the features having the same last two digits in the reference numerals have the same or similar function, a feature in one embodiment could thus be exchanged for a feature from another embodiment having the same last two digits in the reference numeral, unless clearly contradictory. The descriptions of the features having the same last two digits in the reference numerals should thus be seen as complementing each other in describing the fundamental idea of the feature and thereby showing the features versatility.

[0026] A vacuum cooler is to be understood as a machine which generates a vacuum which causes water on the surface of a product to evaporate, which cools the product. The evacuated gas is replaced by chilled, dry and filtered air. The vacuum cooling efficiently and rapidly cools the core and surface of a flower to a uniform temperature, and the process of creating a vacuum also removes gases, such as ethylene, and potentially damaging organisms and aerosols from the environment of the flower.

[0027] A box for shipping is to be understood as any box with properties enabling the box to be used for shipping. The box may be a disposable box or may be a box which may be returned and used over and over again. As an example, the box may be a disposable cardboard box made from corrugated paper and having a structure rigid enough to retain its form during conventional shipping and handling.

[0028] Flexible sheet material is to be understood as any material or combination of materials possible to fixate to the walls of a box for shipping or to wrap around a box for shipping. The flexible sheet material may be resilient or elastic or may be substantially inelastic but collapsible.

The flexibility of the sheet material may come inherent as a property of the selected material and/or may be a result of the mechanical structure or texture of the material such as e.g. pleated portions of the sheet material.

[0029] Reflective surface is to be understood as any surface having the capability of reflecting electromagnetic radiation, such as visible or infrared light. Reflectance value is to be understood as a value specifying the amount of reflected radiation in relation to the amount of received radiation, i.e. a reflectance value of 0,9 indicates that 90% of the energy of the received radiation (such as infrared light) is reflected, meaning that 10% is absorbed.

[0030] Infrared (IR) light is electromagnetic radiation with longer wavelengths than those of visible light, thermal radiation emitted by objects near room temperature is mostly infrared.

[0031] Generally, a shipping method for flowers is disclosed. The shipping method includes the steps of packaging the flowers in a box for shipping, vacuum cooling the box and the flowers packaged therein in a vacuum cooler to a temperature in the range 1°C - 10°C and applying a flexible sheet material onto the box for shipping. The flexible sheet material comprises a reflective surface facing away from the box when applied, for reflecting infrared radiation. A second less reflective surface is facing the inside of the box for absorbing infrared radiation. The flexible sheet material causes infrared radiation from the surrounding material to be reflected away from the box, whereas infrared radiation generated by the flowers on the inside of the box is absorbed by the less reflective surface facing the inside of the box, and is thereby transferred away from the flowers.

[0032] The method further comprises the step of shipping the flowers when the packaging steps are concluded.

[0033] The method may further comprise the placing of cooling elements inside the box for shipping, such that the cold environment in the box can be retained for a longer time.

[0034] The described method enables flowers to be shipped in small quantities, in an environment having a precisely controlled temperature, using conventional containers and/or vehicles, i.e. containers and/or vehicles without built-in cooling capabilities. The method increases the certainty that all flowers in a shipment have been exposed to the same external conditions. Furthermore the method eliminates the risk that the flowers are exposed to sunlight and reduces the risk that the flowers will be exposed to frost. Further advantages include that the use of conventional containers and vehicles further reduces the cost of transportation and speeds up the transportation process, as conventional parcel delivery services with frequent departures may be used.

[0035] Fig. 1 is a system and method overview of the chain of transportation according to one embodiment. The process of securely packaging the cut flowers 101 for transportation begins with the step of placing **a** the flowers 101 in the box for shipping 102. The placing in the box 102 may be preceded by steps of further packaging the flowers 101, individually or in bundles. The further packaging may be by means of wrapping the flowers 101 in a suitable material, such as paper or plastic, or placing the flowers 101 in cartons which in turn are placed in the box for shipping 102. The flowers 101 may be secured inside of the box 102 using a filling material and/or by means of friction increasing material being placed between the bundles or cartons. The friction increasing material makes sure that the flowers remain in place during shipping. The friction increasing material may be an anti-slip paper (shown in fig. 2a), being a paper with a silicon coating. In alternative embodiments, the step of adding anti-slip paper may be assisted or replaced by the step of gluing the flowers or flower bundles such that the flowers or flower bundles are fixated to each other or to the inside surfaces of the box for shipping. The filling material could for example be a polymer foam, such as polyurethane foam, which could be placed in the box for shipping 102 as a sheet material or as smaller filling elements.

[0036] The step of packaging may further include the step of placing cooling elements (shown in fig. 2a) in between the flowers 101 in the box 102. The cooling elements may be in the form of ice gel packs made from packaged and frozen Hydroxyethyl Cellulose. Preferably, the ice packs are ice packs having a relatively larger mass, preferably exceeding 1 liter, such that the ice pack may remain frozen or semi-frozen during transports up to 100 hours.

[0037] The box 102 may be sealed and closed as a step of the packaging process, or may be left open when being placed in the vacuum cooler.

[0038] When the flowers 101 are properly packaged in the box for shipping 102 the entire box 102a is placed **b** alongside other boxes 102b, 102c in a vacuum cooler 103. The vacuum cooler 103 is a machine that lowers the pressure surrounding the boxes 102a, 102b, 102c, and thus the flowers 101. The decrease in pressure reduce the boiling point of water present on the surface of the flowers 101, causing the water to evaporate. Evaporation is an endothermic process which cools the surface from which the water is evaporated, thus efficiently cooling the flowers 101. The vacuum cooler 103 basically comprises a vacuum chamber which is accessed through a vacuum tight door 104. After the vacuum tight door 104 has been closed, and thus the chamber has been sealed, a vacuum pump of the vacuum cooler 103 evacuates the air from the chamber consequently reducing the pressure therein. The evacuation of the air from the chamber also evacuates gases, such as ethylene, and potentially damaging organisms and aerosols. The evacuated air and gasses are replaced by chilled and filtered air before the vacuum tight door 104 is reopened and the boxes for shipping 102a, 102b, 102c are removed.

[0039] After being vacuum cooled, the box 102 is wrapped, manually or by means of a therefor adapted machine, in a flexible sheet material 105. The flexible sheet material 105 is in accordance with one embodiment

a flexible sheet material 105 comprised of a polyethylene foil laminated with a layer of aluminum. The flexible sheet material 105 has a first surface, i.e. the surface having the layer of aluminum, which is reflective, and a second surface, i.e. the surface of the polyethylene layer which is less reflective. In alternative embodiments other combinations of materials are conceivable as long as the required effect of having a first and second surface with different reflectivity is achieved. The flexible sheet material 105 is preferably impermeable to gases, which increases the insulating effect of the sheet material 105 and maintains the filtered environment created in the vacuum cooling step.

[0040] In embodiments when the sheet material comprising the reflective surface is applied before the box is vacuum cooled, the sheet material may comprise holes allowing the vacuum cooling process to access the inside of the box, said holes are covered such that the box is sealed after the vacuum cooling process has been concluded.

[0041] After the box for shipping 102 has been sealed and/or wrapped in the flexible sheet material 105, the box 102 may be placed on a pallet 106 or packed in a conventional container 108, shown in the embodiment of fig. 1 as an air freight container 108 adapted to be shipped **e2** in an airplane 109, or placed **e1** directly into a conventional transportation vehicle, such as the truck 107, for transportation.

[0042] Fig. 2a shows a detailed cross-sectional view of the box for shipping 202. The box 202 is in this embodiment a cardboard box 202 made from rigid corrugated fiberboard. The box may be opened at the top portion 202o such that the cavity of the box 202 may be accessed. In the bottom portion of the box, a sheet material 213 made from polyurethane foam is placed, and on top of that, a friction increasing material 212 in the form of an anti-slip paper made from silicone coated paper is placed. The polyurethane foam 213 functions both as a filling material or upholstery, and as an additional friction increasing material, whereas the anti-slip paper 212 mainly is adapted to increase friction for fixating the flowers in relation to the box 202.

[0043] The flowers 201 are bundled and wrapped in paper or plastic before being placed in the box 202, and additional anti-slip paper 212 is placed between the bundles for fixating the bundles of flowers 201 in relation to each other. Cooling elements 214 in the form of ice gel packs 214 made from packaged and frozen Hydroxyethyl Cellulose are placed in between the flowers 201 for keeping the flowers 201 cold for a longer period. The top portion of the box 202 is also equipped with a foam sheet material 213 and an anti-slip paper 212 before the box 202 is sealed. In an alternative embodiment, the anti-slip paper may be assisted or replaced by the flower bundles being glued to each other and/or to the inside surface of the box for shipping.

[0044] When the box is sealed, the entire box is wrapped with a flexible sheet material 205 which in the embodiment of fig. 2a is a flexible sheet material 205 comprised of a polyethylene foil laminated with a layer of aluminum. The flexible sheet material 205 has a first surface 216, i.e. the surface having the layer of aluminum, which is reflective, and a second surface 217, i.e. the surface of the polyethylene layer which is less reflective. In alternative embodiments other combinations of materials are conceivable, such as films made from other polymer materials or paper laminated with a metallic foil. The important thing being that the required effect of having a first 216 and second 217 surface with different reflectivity is achieved. The flexible sheet material 205 is preferably impermeable to gases, which increases the insulating effect of the sheet material 205.

[0045] The first reflective surface 216 may be a surface having a reflectance value above 0,85. It is furthermore conceivable that the first reflective surface 216 may be a surface having a reflectance value of above 0,7 or above 0,75 or above 0,8 or above 0,9, or above 0,95. The second reflective surface 217 may be a surface having a reflectance value of below 0,9 or below 0,85 or below 0,8 or below 0,75 or below 0,7 or below 0,6.

[0046] The first reflective surface 216 reflects infrared radiation coming from the outside of the box 202, thus not absorbing heat and thus keeping the flowers 201 on the inside of the box 202 cool. The second less reflective surface 217 on the other hand is less reflective for the purpose of, to a greater extent, absorbing infrared radiation which originates from within the box 202, created by the respiration of the flowers 201. As the heat coming from the outside is blocked by the flexible sheet material 205, at the same time as heat generated on the inside of the box 202 is transferred to the outside, the flexible sheet material 205 aids in the keeping the contents of the box 202 cold irrespectively of the origin of the generated heat.

[0047] Fig. 2b is an enlarged view of a portion of the wall of the box for shipping 202, showing the layers of the box, i.e. the corrugated fiberboard wall 202a, the flexible sheet material 205, the polyurethane foam 213, the anti-slip paper 212. Fig. 2b further shows the first reflective surface 216 reflecting infrared radiation IR coming from outside the box 202 and the second less reflective surface 217 absorbing infrared radiation IR coming from inside the box 202.

[0048] Fig. 3 shows a perspective view of a box for shipping 302 according to a second embodiment, in which the box for shipping 302 comprises a top portion 302t and a bottom portion 302b. In the embodiment shown in fig. 3a, the bottom portion 302b of the box 302 is adapted to contain the flowers and the top portion 302t is adapted to serve as a lid for the box 302. The walls of the bottom portion 302b comprises in this embodiment comprises rigid corrugated fiberboard 302a lined with a sheet material 313 made from expanded polystyrene. The expanded polystyrene could alternatively be polyurethane foam or another insulating material. The insulating sheet material 313 has a surface facing the inside

of the box 302 which is less reflective than the reflective surface 316 of the sheet material 305. The less reflective surface 313 is adapted to absorb infrared radiation **IR** which originates from within the box 302, created by the respiration of the flowers.

[0049] The top portion 302t, serving as a lid to the box 302, is also made of a rigid corrugated fiberboard 302a and is covered by a sheet material 305 having a reflective surface 316 facing the environment exterior from the box 302. The sheet material 305 may be a layer of aluminum applied to the surface of the corrugated fiberboard 302a by means of an adhesive. The flexible sheet material 305 is preferably impermeable to gases, which increases the insulating effect of the sheet material 305.

[0050] The reflective surface 316 may be a surface having a reflectance value above 0,85. It is furthermore conceivable that the reflective surface 316 may be a surface having a reflectance value of above 0,7 or above 0,75 or above 0,8 or above 0,9, or above 0,95.

[0051] The surface facing the inside of the box 302, which in this embodiment is the surface of the insulating sheet material 313, may be a reflectance value of below 0,9 or below 0,85 or below 0,8 or below 0,75 or below 0,7 or below 0,6.

[0052] The reflective surface 316 of the sheet material 305 reflects infrared radiation **IR** coming from the outside of the box 302, thus not absorbing heat and thus keeping the flowers on the inside of the box 302 cool. The surface facing the inside of the box 302, i.e. the surface of the insulating sheet material 313, on the other hand is less reflective for the purpose of, to a greater extent, absorbing infrared radiation **IR** which originates from within the box 302, created by the respiration of the flowers.

[0053] As the heat coming from the outside is blocked by the reflective surface 316, at the same time as heat generated on the inside of the box 302 is transferred to the outside, the sheet material 305 and the box 302 aids in the keeping the contents of the box 302 cold irrespectively of the origin of the generated heat.

[0054] The box 302 of the embodiment of fig. 3a further comprises holes 320t, 320b. In the bottom portion 302b, the holes 320t, 320b are made in the corrugated fiberboard 302a and in the insulating liner 313, and in the top portion 302t, the holes are made in the corrugated fiberboard 302a and in the sheet material 305 having the reflective surface 316. The holes enables the vacuum cooling process to reach the inside of the box 302, such that the flowers can be vacuum cooled inside of the box 302 even if the box 302 has been closed by the top portion 302t being placed onto the bottom portion 302b, as the holes 320t, 320b of the bottom and top portions 302b, 302t, align.

[0055] Fig 3b shows the box 302 for shipping in accordance with the embodiment of fig. 3a, when the box 302 has been closed by the top portion of the box 302 having been placed onto the bottom portion of the box. The box 302 has been sealed by the holes (320b, 320t of fig. 3a) having been covered by an adhesive sheet 321, such that the environment of the inside of the box is isolated from the ambient environment. The sealing of the box 302 preserves the environment inside of the box created by the vacuum sealing process. Alternatively, the sealing could be performed by means of plugs placed in the holes.

[0056] Fig. 4 is a flowchart describing a method of shipping cut flowers according to one embodiment. Please note that the order of the method steps may be altered. The shipping method comprises packaging the flowers in a box for shipping **a**, which may comprise the steps of packaging the flowers in bundles or cartons prior to shipping, and then packaging the bundles or cartons in the box for shipping.

[0057] The method may optionally comprise the steps of placing **a2** cooling elements in the box. The cooling elements may be non-electric cooling elements inside the box, i.e. cooling elements that are cooled or frozen or cooling elements that cools by means of a phase change. The cooling elements may for example be Hydoxyethyl Cellulose cooling elements. In additional steps, the method may further comprise the steps of filling the box with a filling material, such as a polyurethane foam, and/or placing friction increasing material in the box to prevent the flowers from moving inside of the box. The friction increasing material may be a sheet material made from polyurethane foam or a silicone coated paper.

[0058] The method further comprises the step of vacuum cooling **b** the box and flowers to a temperature in the range 1°C - 10°C, or to a temperature in the range 2°C - 6°C, or to a temperature in the range 2°C - 4°C.

[0059] After the box has been vacuum cooled, a flexible sheet material is optionally applied **c1** onto the box for shipping. The flexible sheet material comprises a first reflective surface facing away from the box when applied, for reflecting infrared radiation, and a second less reflective surface facing the box when applied, for absorbing infrared radiation. The applied sheet transports heat generated by the flowers away from the box and reflects heat coming from outside the box. Alternatively, the flexible sheet material has been applied to the box before the flowers were packaged in the box, for example as an outer layer of the box applied by means of an adhesive. In the alternative in which the flexible sheet material has been applied to the box before the flowers were packaged, the box and thus also the flexible sheet material comprises at least one hole or opening, such that the vacuum cooling process in step b reaches the inside of the box. In embodiments in which the box comprises at least one opening or hole, the method comprises the step of sealing the box **c2**, such that the environment created inside of the box by the vacuum cooling process is preserved. The sealing of the box could for example be performed by means of plugs placed in the holes, covering the holes, or by means of an adhesive sheet placed over the holes.

[0060] As a last step, the method comprises the step of shipping **d** the box, which may comprise shipping the

box by means of road, rail road, air or sea transportation. The shipping may be performed by conventional shipping, such as by means of a conventional parcel service.

[0061] The different aspects or part of the aspects of the disclosed embodiments may all be combined in any possible way, unless clearly contradictory. Any method or any step of a method should be seen also as a description of the elements necessary to carry out said method. Any detailed description should be interpreted in its broadest outline as a general description of the inventive idea.

Claims

1. A shipping method for shipping cut flowers (101,201), the shipping method comprising:

   a. packaging (a) the flowers in a box (102,202,302) for shipping,
   b. vacuum cooling (b) the box and flowers to a temperature in the range 1°C - 10°C,
   c. applying (c) a flexible sheet material (105,205,305) onto the box (102,202,302) for shipping, the flexible sheet material (102,202,302) comprising a first reflective surface (216,316) facing away from the box (102,202,302) when applied, for reflecting infrared radiation (IR), wherein a second surface (217,313), being less reflective than the first surface (216,316) is facing the inside of the box, for absorbing infrared radiation (IR), and
   d. shipping (d) the flowers (101,201).

2. The shipping method according to claim 1, wherein the second less reflective surface is a second surface (212) of the flexible sheet material.

3. The shipping method according to claim 1, wherein the step of applying (c) a flexible sheet material (105,205,305) comprises applying an impermeable flexible sheet material.

4. The shipping method according to any one of the preceding claims, further comprising the step of placing cooling elements (214) inside the box (102,202,302).

5. The shipping method according to claim 4, wherein the step of placing cooling elements inside the box comprises placing non-electric cooling elements inside the box.

6. The shipping method according to claim 5, wherein the step of placing cooling elements inside of the box comprises placing Hydoxyethyl Cellulose cooling elements inside the box.

7. The shipping method according to any one of the preceding claims, wherein the step of applying (c) a flexible sheet material (105,205,305) onto the box (102,202,302) for shipping, comprises applying a flexible sheet material (105,205,305) comprising a polyethylene layer laminated with an aluminum layer.

8. The shipping method according to any one of the preceding claims, wherein the step of applying (c) a flexible sheet material (105,205,305) onto the box (102,202,302) for shipping is performed before the flowers are packaged in the box.

9. The shipping method according to any one of the preceding claims, wherein the step of applying (c) a flexible sheet material (105,205,305) onto the box (102,202,302) for shipping, comprises applying a flexible sheet material (105,205,305) onto the box using an adhesive.

10. The shipping method according to any one of the preceding claims, further comprising the step of sealing the box.

11. The shipping method according to any one of the preceding claims, further comprising fixating the flowers (101,201) inside the box (102,202,302) using at least one of:

    a. a polyurethane foam (213),
    b. silicone coated paper (212),and
    c. glue.

12. A box for the shipping method of any one of claims 1 - 11, the box (102,202,302) comprising:

    a. box walls made from a rigid sheet material (202a,302a), and
    b. a flexible sheet material (105,205,305) enclosing the walls, **characterized in that** the flexible sheet material (105,205,305) comprises a reflective surface (216,316) facing away from the box (102,202,302) when applied, for reflecting infrared radiation (IR), wherein a second surface (217,313), being less reflective than the first surface, (216,316) is facing the inside of the box, for absorbing infrared radiation (IR).

13. The box according to claim 12, wherein the flexible sheet material (105,205) comprises a first layer of aluminum comprising the reflective surface (216), and a second layer of polyethylene comprising the less reflective surface (217).

14. The box according to any one of claims 12 - 13, wherein the first reflective surface (216) has a reflectance value above 0,85.

15. Use of the box according to any one of claims 12 - 14 for shipping fresh cut flowers.

Fig.1

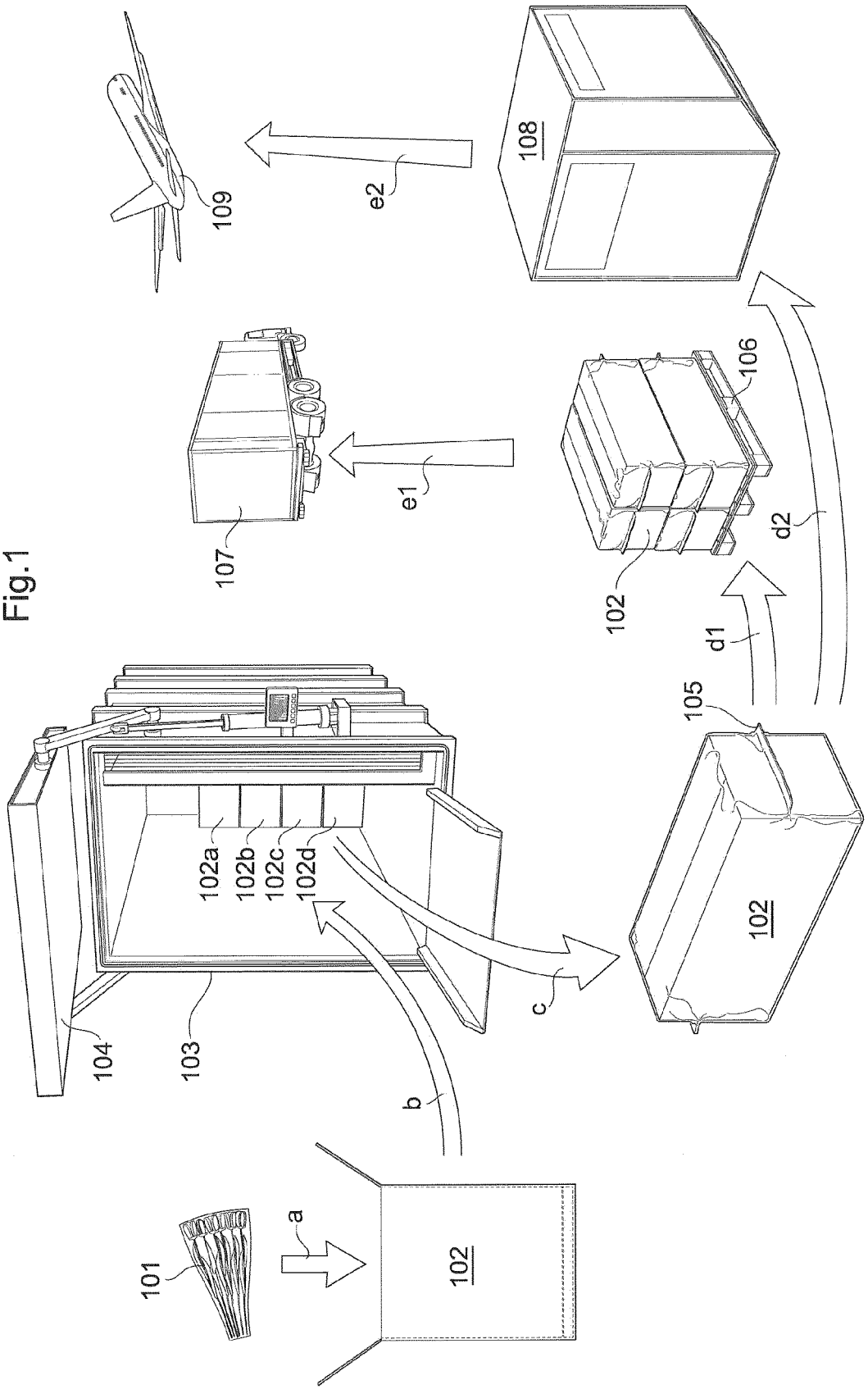
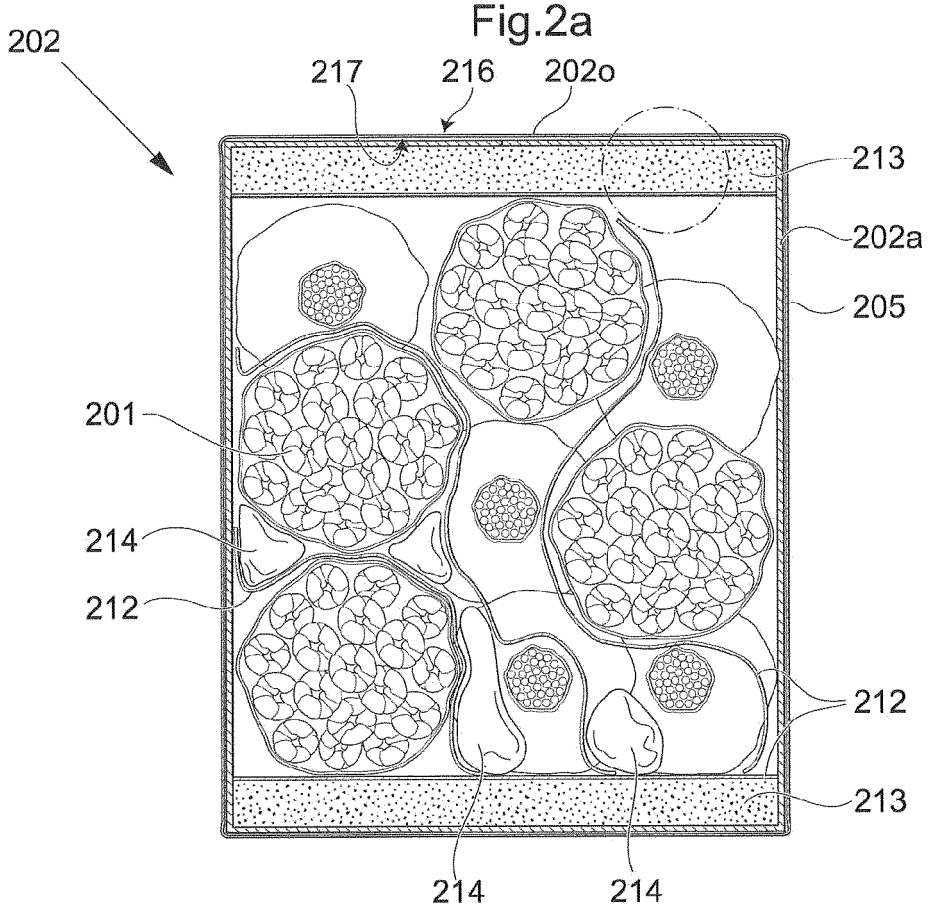

101
a
102
b
102a
102b
102c
102d
103
104
c
102
105
d1
106
102
d2
e1
107
e2
108
109

Fig.2a


202
217
216
202o
213
202a
205
201
214
212
212
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214
214

Fig.2b

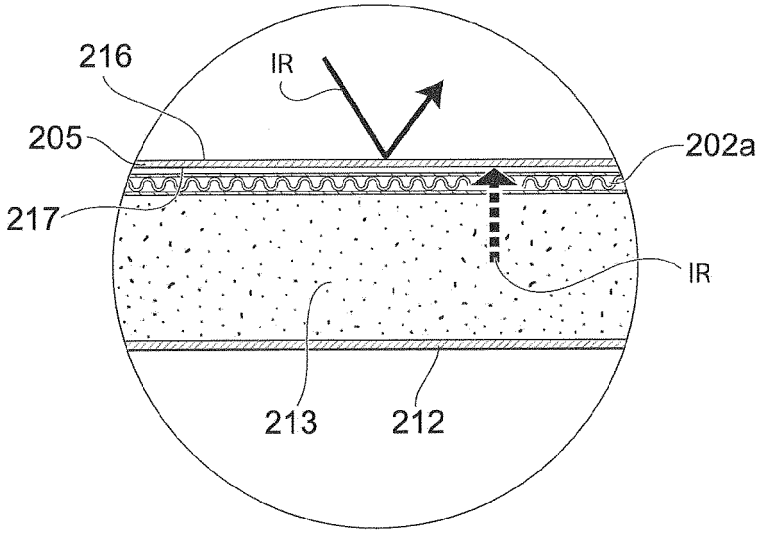

216
IR
205
202a
217
IR
213
212

Fig.3a

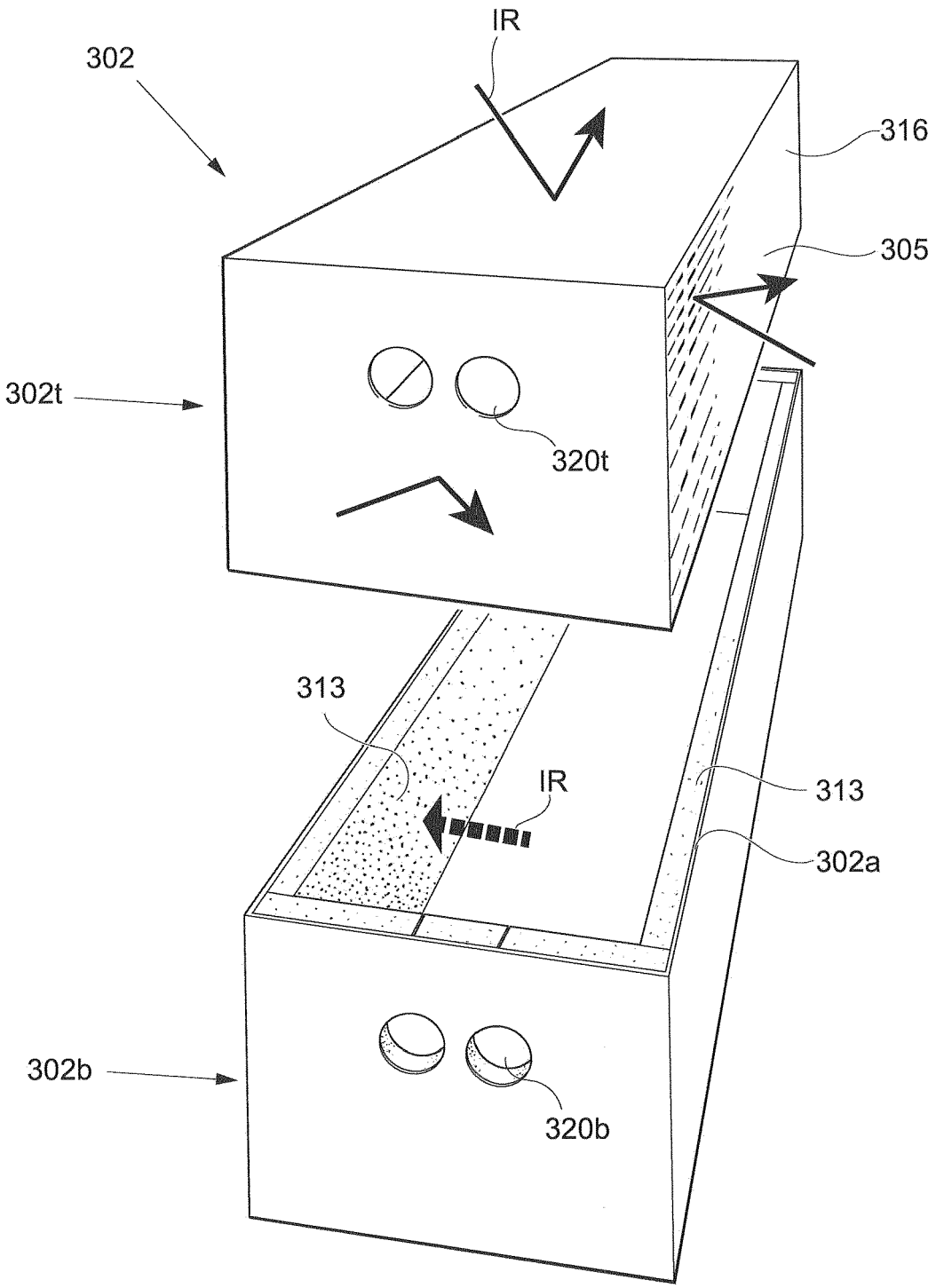
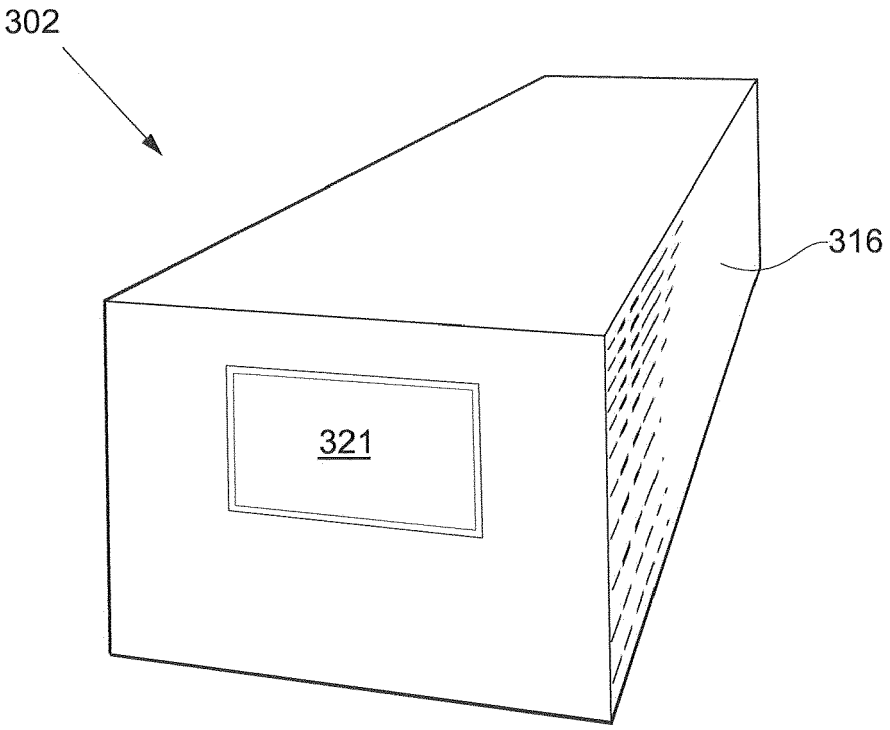


Fig.3b



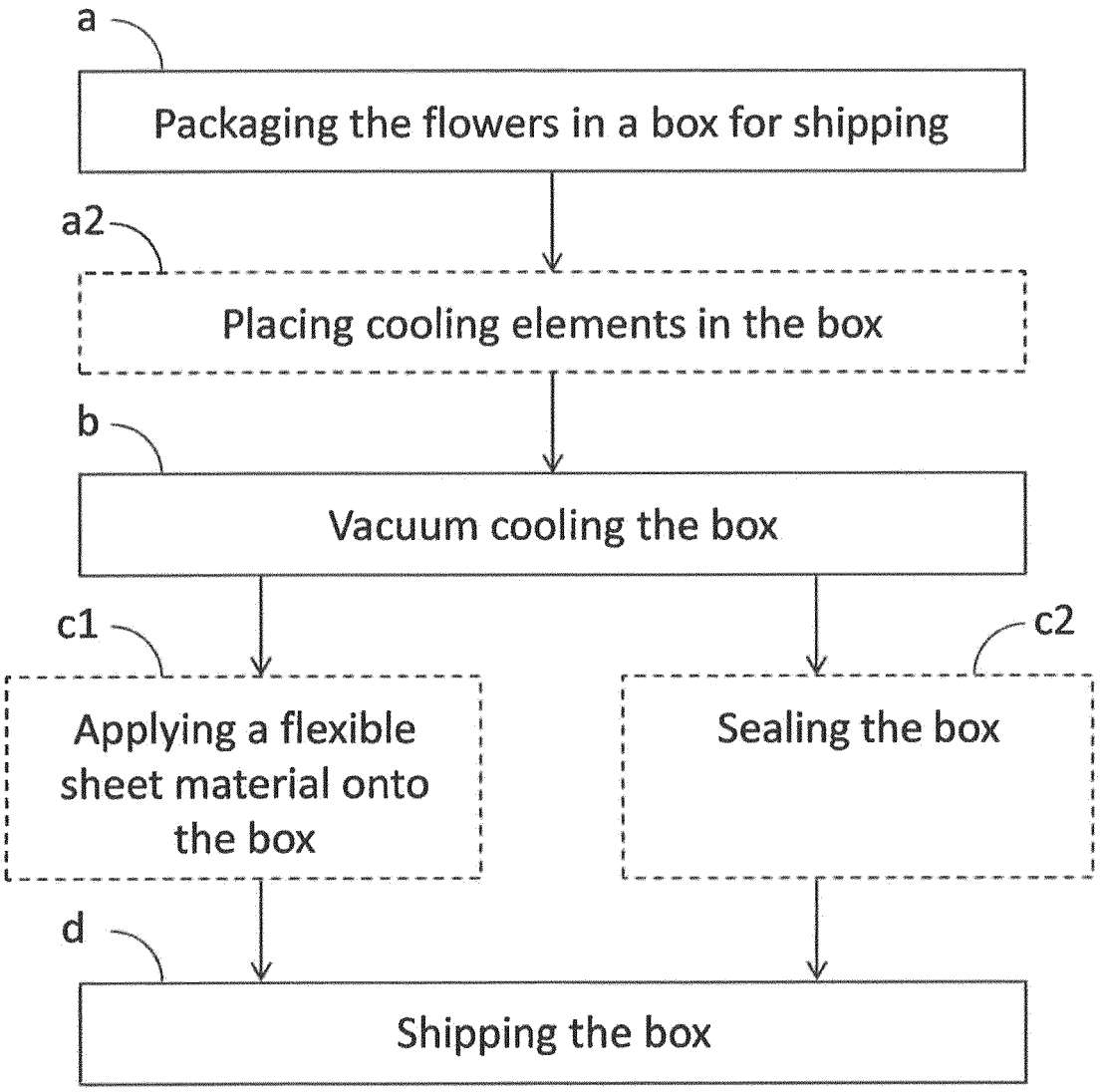

a
Packaging the flowers in a box for shipping
a2
Placing cooling elements in the box
b
Vacuum cooling the box
c1
Applying a flexible sheet material onto the box
c2
Sealing the box
d
Shipping the box

Fig. 4

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EUROPEAN SEARCH REPORT

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Y	Anonymous: "Knowledge about Gel Ice Packs, Hot Cold Packs, Instant Reusable Ice Pack", IcePackClub , 27 February 2013 (2013-02-27), XP002731277, Retrieved from the Internet: URL:http://icepackclub.wordpress.com/ [retrieved on 2014-10-16] * the whole document *	6	TECHNICAL FIELDS SEARCHED (IPC) B65D
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Place of search	Date of completion of the search	Examiner
Munich	7 September 2015	Czerny, M

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