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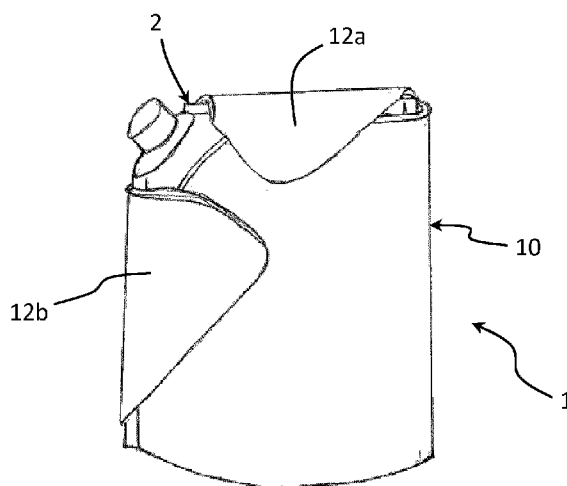


Fig. 3

(57) Abstract: Disclosed is a container (1) for dispensing a frozen confection. The container (1) comprises a flexible pouch (2) and a removable sleeve (10). The pouch comprises a wall (4) delimiting a cavity containing the frozen confection and extending from a base end (6) to a dispensing end (5) of the pouch, wherein the dispensing end comprises a product outlet (8) through which the frozen confection can be extruded from the cavity. The removable sleeve (10) at least partly surrounds the wall (4) of the pouch (2) and is sufficiently flexible to allow transmission of manual force through the sleeve to deform the wall at least at the base end (6) of the pouch and thereby urge the frozen confection in the cavity towards the outlet and be extruded therefrom. The sleeve also has a retaining part (12a, 12b) releasably engaging the dispensing end (5) of the pouch to retain the pouch within the sleeve during extrusion of the frozen confection through the product outlet.



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CONTAINER FOR FROZEN CONFECTION

Field of the invention

The present invention relates to containers for frozen confections such as ice cream. In particular, the invention relates to containers that are adapted for dispensing frozen confections at low temperatures by manual force.

Background of the invention

In recent years, systems for dispensing frozen confections such as ice cream have been developed in which pre-packaged ice cream is provided in containers that can be squeezed by hand to extrude the confection. In particular pouch-based systems have been developed.

US 2009/0208630 A discloses a spout pouch ice cream and frozen yogurt manufacturing method and a device capable of injecting ice cream after an overrun process through a narrow drinking tube of the spout pouch.

The present inventors have now recognized that there is a need for improvements in pouch-based containers for dispensing frozen confections like soft ice. In particular the present inventors have found that there is a need for containers that allow consumers to effectively grip the pouches to obtain sufficient purchase when squeezing to dispense frozen confections at the very low temperatures typical of a domestic freezer. At such temperatures the pouch wall can be uncomfortable to handle and therefore dissuade consumers from holding the pouch for sufficient time or with sufficient grip. Moreover the inventors have found that being able to apply manual force in the vicinity of the base of the pouch is especially important to allow efficient dispensing.

The present inventors have thus developed a container wherein a removable sleeve can be applied to the pouch to allow consumers to comfortably apply the required force.

Summary of the invention

In a first aspect, the present invention is directed to a container for dispensing a frozen confection, the container comprising:

- a flexible pouch comprising a wall delimiting a cavity containing the frozen confection and extending from a base end to a dispensing end of the pouch, wherein the

dispensing end comprises a product outlet through which the frozen confection can be extruded from the cavity; and

- a removable sleeve at least partly surrounding the wall of the pouch and being sufficiently flexible to allow transmission of manual force through the sleeve to deform the wall at least at the base end of the pouch and thereby urge the frozen confection in the cavity towards the outlet and be extruded therefrom and wherein the sleeve has a retaining part releasably engaging the dispensing end of the pouch to retain the pouch within the sleeve during extrusion of the frozen confection through the product outlet.

- 10 Flexible pouches are well-known in the art and typically have walls formed from polymer films, especially multi-layer laminated polymer films. Preferred polymers are polyethylene, polyethylene terephthalate, polypropylene, polyamide and combinations thereof.

- 15 The preferred material for the pouch wall of the container of the present invention is one which comprises a thermally conductive material, such as metal. Thermally conductive material is advantageous as typically the frozen confection will be extruded from an ice cream freezer (scraped surface heat exchanger) into the pouch and then the confection structure stabilized by rapid "hardening". Hardening is the step wherein the packaged confection is subjected to very low temperature air to bring the temperature of the
- 20 confection to -20 °C or below. For soft frozen confections dispensable from a pouch, the hardening step is especially important to stop the structure created in the ice cream freezer being destroyed by ripening of the ice crystals and/or coalescence of the air bubbles. Conductive material allows heat transfer from the cold air to the confection to occur as efficiently as possible to arrest such structural deterioration. The wall is thus preferably
- 25 formed from a polymer film comprising a metal layer, most preferably an aluminum layer.

- The product outlet could take any form such as a simple orifice. Preferably, however the outlet is in the form of a spout as this allows for more controlled dispensing, for example into an ice cream cone or other receptacle. To reduce the amount of manual force required
- 30 to be applied to extrude the confection, it is preferred that the spout has an inner diameter of at least 10 mm, more preferably at least 12 mm and most preferably from 15 to 35 mm.

- The cavity of the pouch should be sufficient to hold at least one serving of frozen confection. The present invention has particular advantages, however, where the pouch contains
- 35 multiple servings of frozen confection and the pouch is stored in a frozen condition between

dispensing occasions. Therefore it is preferred that the amount of frozen confection in the cavity is at least 200 g, more preferably at least 300 g, more preferably still at least 350 g and most preferably from 400 g to 1000 g.

- 5 The present inventors have found that the cold feeling experienced when handling a pouch containing frozen confection depends not only on the temperature of the product contained in the pouch but also on the presence of condensed moisture and/or ice on the outer surface of the wall. Therefore the sleeve of the present invention is removable from the pouch such that the sleeve itself does not need to be stored in the freezer wherein its
10 surface would be susceptible to condensation and ice formation. Thus when the sleeve is applied to the pouch after removing the pouch from a freezer, the surface handled by the consumer is the sleeve surface which does not feel uncomfortably cold to the touch. As used herein the term “removable” means that the sleeve can be repeatedly removed and reapplied to the pouch to provide the container of the invention. Similarly the term
15 “releasable” means that the retaining part can be repeatedly engaged and disengaged with the dispensing end of the pouch.

The feature that the sleeve is removable also aids in recycling and/or reuse, especially wherein the sleeve is of a different material to the wall of the pouch and thus could not be
20 recycled in the same manner and/or the sleeve is more durable than the pouch and therefore suitable for reuse with additional pouches.

Although a large part of the uncomfortable cold feeling induced in the hand of the user is reduced by employing a removable sleeve, further advantages may be obtained by
25 employing an insulating material in the sleeve. In particular heat from the hand of a user can quickly be transmitted through the wall of the pouch, causing the frozen confection within the pouch to melt and thus destroy the carefully created microstructure. Thus preferably the sleeve comprises, consists essentially of or consists of a thermally-insulating material. As used herein “thermally-insulating” means having a thermal conductivity of less
30 than $1 \text{ W m}^{-1} \text{ K}^{-1}$, more preferably less than $0.5 \text{ W m}^{-1} \text{ K}^{-1}$ and most preferably from 0.0001 to $0.1 \text{ W m}^{-1} \text{ K}^{-1}$.

Additionally or alternatively the sleeve comprises, consists essentially of or consists of an elastomer, most preferably neoprene. Elastomeric material provides extra grip and so
35 increases the ease of handling and squeezing the container. Preferably the elastomer is

foamed to enhance thermal insulation, most preferably the sleeve comprises foamed neoprene.

5 The sleeve is such that it allows transmission of manual force through the sleeve to deform the wall at least at the base end of the pouch. Applying force to the base of the pouch is important as this not only allows for more complete emptying of the pouch but also allows for efficient transmission of force. For example the inventors have found that many users find gripping the base of the container and then rolling the sleeve and wall up from the base whilst squeezing is especially convenient. Thus it is preferred that the sleeve allows for
10 transmission of manual force through the sleeve to allow the wall to be rolled up towards the outlet. Additionally or alternatively, the sleeve completely envelops the base end of the pouch.

The more flexible the sleeve, the more easy it is to transmit force through the sleeve to the
15 wall of the pouch. Thus it is preferred the sleeve is flexible such that it is not self-standing.

Preferably the sleeve is such that it allows a user to grip substantially anywhere on container. Therefore preferably the sleeve surrounds at least 80% of the external surface area of the wall, more preferably from 90 to 100%.

20

One drawback of reusing a removable sleeve is that residue of frozen confection deposited on the sleeve from earlier uses can be messy or even pose a hygiene risk. These problems can be ameliorated by designing the sleeve such that it has minimal contact with the product outlet both during dispensing and during applying and removing the sleeve. The
25 present inventors have found that this objective can be achieved by providing a sleeve that comprises an opening disposed towards the dispensing end of the pouch and through which the base end of the pouch can be inserted prior to engaging the retaining part to the dispensing end of the pouch. More preferably, the retaining part is configured such that it can be engaged to the dispensing end without passing over the product outlet. For
30 example, the retaining part may comprise one or more flaps that extend from the sleeve on a first side of the dispensing end and pass around the outlet to a second side to which they can be reversible secured.

The container of the present invention allows for efficient transfer of manual force and thus
35 allows effective dispensing of a range of frozen confections. To aid, dispensing, however it

is preferred that the frozen confection within the container is formulated to be soft and yet stable at a range of temperatures encountered in domestic freezers. In particular it is preferred that the frozen confection comprises freezing point depressants in an amount of from 25 to 35% by weight of the frozen confection, wherein the number average molecular weight $\langle M \rangle_n$ of the freezing point depressants is less than 250 g mol⁻¹.

For the purposes of the present invention, the average molecular weight for a mixture of freezing point depressants is defined by the number average molecular weight $\langle M \rangle_n$ (Equation 1). Where w_i is the mass of species i , M_i is the molar mass of species i and N_i is the number of moles of species i of molar mass M_i .

$$\langle M \rangle_n = \frac{\sum w_i}{\sum (w_i / M_i)} = \frac{\sum N_i M_i}{\sum N_i} \quad (\text{Equation 1})$$

Freezing point depressants as defined in this invention consist in:

- monosaccharides and disaccharides
- oligosaccharides containing from three to ten monosaccharide units joined in glycosidic linkage.
- corn syrups with a dextrose equivalent (DE) of greater than 20 preferably > 40 and more preferably > 60. Corn syrups are complex multi-component sugar mixtures and the dextrose equivalent is a common industrial means of classification. Since they are complex mixtures their number average molecular weight $\langle M \rangle_n$ can be calculated from Equation 2 below. (*Journal of Food Engineering*, 33 (1997) 221-226)

$$\text{DE} = \frac{18016}{\langle M \rangle_n} \quad (\text{Equation 2})$$

- erythritol, arabitol, glycerol, xylitol, sorbitol, mannitol, lactitol and malitol.
- ethanol.

The amount of ice in the product is determined, to a large extent by the amount and molecular weight of the freezing point depressants. The present inventors have found that if the amount of ice is too high, then the confection becomes too difficult to extrude at low temperatures found in some storage freezers (for example -22 °C). Thus the freezing point

depressants preferably have a number average molecular weight $\langle M \rangle_n$ of no more than 250 g mol⁻¹, and are present in an amount of at least 25% by weight of the frozen confection. More preferably the amount of freezing point depressants is at least 26%, even more preferably at least 27% by weight of the frozen confection.

5

Preferably the number average molecular weight $\langle M \rangle_n$ of the freezing point depressants is no more than 240, more preferably no more than 230 and most preferably no more than 220 g mol⁻¹.

- 10 On the other hand if the amount of freezing point depressants becomes too high and/or their molecular weight becomes too low then the rheology will very liquid-like at higher temperatures encountered in some storage freezers (for example -16 °C). Thus the freezing point depressants preferably have a number average molecular weight $\langle M \rangle_n$ of no less than 200 g mol⁻¹, and are present in an amount of no more than 35% by weight of the frozen
- 15 confection. More preferably the amount of freezing point depressants is no more than 34%, more preferably still no more than 33% and most preferably no more than 32% by weight of the frozen confection.

- Preferably the number average molecular weight $\langle M \rangle_n$ of the freezing point depressants is
- 20 no less than 205, more preferably no less than 208 and most preferably no less than 210 g mol⁻¹.

- The present inventors have found that erythritol is particularly effective at imparting the desired rheological properties to the frozen confection. In addition, in comparison to some
- 25 other sugar alcohols, erythritol does not impart an unpleasant off-taste, is not overly sweet and does not interfere with natural digestion and excretion of food. Thus it is preferred that the freezing point depressants comprise erythritol.

- Preferably the amount of erythritol is at least 0.25%, more preferably at least 0.5%, even
- 30 more preferably at least 0.7% and most preferably at least 1% by weight of the frozen confection.

- Preferably the amount of erythritol is not too high, otherwise the confection may be too liquid-like and/or it may be difficult to formulate the confection with the desired sweetness.
- 35 Thus it is preferred that the amount of erythritol is no more than 7%, more preferably no

more than 6%, even more preferably no more than 5%, more preferably still no more than 4% and most preferably no more than 3% by weight of the frozen confection.

5 Other than erythritol, it is preferred that the freezing point depressants are substantially comprised of saccharides. Preferably the freezing point depressants comprise at least 90% by weight of the freezing point depressants of mono, di and oligosaccharides, more preferably at least 92%. The total amount of mono, di and oligosaccharides and erythritol in the freezing point depressants is preferably at least 98% by weight of the freezing point depressants, more preferably 99 to 100%.

10

An especially preferred disaccharide is lactose as this provides freezing point depression without imparting a high amount of sweetness. Preferably the freezing point depressants comprise lactose in an amount of at least 5% by weight of the freezing point depressants, more preferably from 10 to 25% by weight of the freezing point depressants. The lactose
15 may be present in the confection as part of milk solids and/or added separately from milk solids.

Certain freezing point depressants are undesirable as they impart unwanted taste and/or physiological effects.

20

Preferably the frozen confection comprises less than 0.5% ethanol by weight of the frozen confection, more preferably less than 0.1% and more preferably still less than 0.01%, and most preferably 0%.

25 Preferably the frozen confection comprises less than 1.5% glycerol by weight of the frozen confection, more preferably less than 1% and more preferably still less than 0.5%, and most preferably from 0.2 to 0%. Additionally or alternatively the total amount of arabitol, glycerol, xylitol, sorbitol, mannitol, lactitol and malitol in the frozen confection is less than 1.5% by weight of the frozen confection, more preferably less than 1% and more preferably still less
30 than 0.5%, and most preferably from 0.2 to 0%.

Preferably the frozen confection comprises less than 5% fructose by weight of the frozen confection, more preferably less than 3% and most preferably from 0 to 2%.

Preferably the freezing point depressant impart the desired sweetness to the frozen confection without the need to use intense sweetener. By "intense sweetener" is meant one or more of aspartame, saccharin, acesulfame K, alitame, thaumatin, cyclamate, glycyrrhizin, stevioside, neohesperidine, sucralose, monellin, and neotame. Preferably the frozen confection is substantially free from intense sweetener. More preferably the frozen confection comprises intense sweetener in an amount less than the amount required to impart an equivalent sweetness as 1% sucrose, more preferably less than the amount required to impart an equivalent sweetness as 0.5% sucrose, and most preferably less than the amount required to impart an equivalent sweetness as 0.1% sucrose. Additionally or alternatively, the frozen confection comprises less than 0.003% intense sweetener, more preferably less than 0.001% and most preferably from 0.0001 to 0%.

The frozen confection is typically made by freezing a mix (more preferably a pasteurized mix) of ingredients such as water, fat, freezing point depressants, protein (normally milk proteins), and optionally other ingredients such as emulsifiers, stabilisers, colours and flavours. Frozen confections include ice cream, gelato, frozen yoghurt, sorbets, granitas, shaved ices and the like. Preferably the frozen confection is ice cream.

The frozen confection is preferably aerated. By "aerated" is meant that the confection has an overrun of at least 30%. More preferably the frozen aerated confection has an overrun of from 70 to 135%, most preferably from 80 to 110%.

Overrun (OR) is defined by the following Equation 3

$$OR = \frac{\text{volume..of..frozen..confection} - \text{volume..of..premix..at..ambient..temp}}{\text{volume..of..premix..at..ambient..temp}} \times 100$$

(Equation 3)

It is measured at atmospheric pressure. Ambient temperature is 20 °C.

The frozen confection preferably comprises fat in an amount of from 1 to 15% by weight of the frozen confection, more preferably from 4 to 12%, and most preferably from 5 to 10%.

The frozen confection preferably comprises protein in an amount of from 0.5 to 8% by weight of the frozen confection, more preferably from 1 to 6%, and most preferably from 1.5 to 5%.

5 In a further aspect the present inventions provides a method for dispensing a frozen confection comprising:

(a) assembling a container by a procedure comprising the steps of:

10 i. providing a flexible pouch comprising a wall delimiting a cavity containing the frozen confection and extending from a base end to a dispensing end of the pouch, wherein the dispensing end comprises a product outlet through which the frozen confection can be extruded from the cavity;

ii. providing a removable sleeve having an opening and a retaining part;

15 iii. inserting the pouch through the opening such that the sleeve at least partly surrounds the wall of the pouch; and

iv. engaging the retaining part to the dispensing end of the pouch;

and

20 (b) applying manual force to the sleeve of the container to deform the wall at least at the base end of the pouch and thereby urge the frozen confection in the cavity towards the outlet and extrude at least a portion of frozen confection therefrom whilst the retaining part retains the pouch within the sleeve.

25 To minimize contact of the sleeve with the product outlet, steps (a)iii and iv preferably comprise inserting the base end of the pouch through the opening and then engaging the retaining part to the dispensing end of the pouch.

30 The sleeve is removable and it is preferred that the sleeve is removed from the pouch following dispensing of a portion of the frozen confection. The container is then preferably reassembled prior to dispensing a further portion of the frozen confection.

Typically the pouch is stored in a domestic freezer between dispensing occasions. Thus it is preferred that between dispensing the portions of the frozen confection, the pouch is

stored in a freezer at a temperature of less than -10 °C, more preferably at a temperature of from -14 to -25 °C, and most preferably from -16 to -22 °C.

5 The method is particularly suitable for containers as described in any embodiment of the first aspect of the invention.

Except in the Examples, all numbers in this description indicating amounts of material, time periods, length scales, conditions of reaction, physical properties of materials and/or use may optionally be understood as modified by the word “about”.

10

It should be noted that in specifying any range of values, any particular upper value can be associated with any particular lower value.

15 For the avoidance of doubt, the word “comprising” is intended to mean “including” but not necessarily “consisting of” or “composed of”. In other words, the listed steps or options need not be exhaustive.

20 The disclosure of the invention as found herein is to be considered to cover all embodiments as found in the claims as being multiply dependent upon each other irrespective of the fact that claims may be found without multiple dependency or redundancy.

25 Where a feature is disclosed with respect to a particular aspect of the invention such disclosure is also to be considered to apply to any other aspect of the invention *mutatis mutandis*.

Brief description of the drawings

The present invention will now be described with reference to the figures, wherein:

30 Figure 1 shows an embodiment of a pouch suitable for use in the invention.

Figure 2 shows an embodiment of a sleeve suitable for use in the invention.

Figure 3 shows an embodiment of a container of the invention comprising the sleeve of Figure 2 applied to the pouch of Figure 1.

35 Figure 4 shows another embodiment of a container according to the invention wherein parts of the pouch within the sleeve are shown with broken lines.

Figure 5 shows yet another embodiment of a container according to the invention wherein parts of the pouch within the sleeve are shown with broken lines.

Detailed description

5 Figures 1 to 3 show a container according to a preferred embodiment of the invention. The container (1) comprises a flexible pouch (2) and a removeable sleeve (10).

As best seen in Figure 1, the pouch (2) is a conventional flexible pouch used, for example, for beverages but in this case containing a frozen confection such as soft ice cream. The
10 wall (4) of the pouch is formed from two sheets of a multilayer polymer-aluminium foil laminate, wherein the sheets are heat-sealed together at the edges of the wall. The pouch extends from a base end (6) to a dispensing end (5). Below the base end (6) is a gusseted base on which the pouch is self-standing on a flat surface. At one corner of the dispensing end (5) a product outlet (8) in the form of a spout is sealingly engaged with the wall (4), for
15 example through heat sealing or adhesive. Although not shown, the product outlet (8) is preferably closable by a removable cap.

Figure 2 shows the sleeve (10) in a state ready to receive the pouch (2). The sleeve is formed from a single sheet of insulating elastomeric material (such as, for example foamed
20 neoprene) rolled into a cylindrical tube extending from a base opening (18) to a top opening (13) which, in the assembled container is disposed at the dispensing end (5) of the pouch (2). A retaining strap (16) spans the base opening (18). The sleeve (10) comprises two retaining flaps (12a and 12b), disposed at the top edge and a side edge of the sleeve respectively. Each flap (12a, 12b) has a reversible attachment area (14a, 14b)
25 corresponding with an associated attachment area (15a, 15b) on an outer surface of the sleeve (10). The attachment areas are corresponding such that they form a reversible bond on contact. For example the attachment areas (14a and 14b) on the flaps could comprise hooks and the corresponding areas (15a and 15b) comprise loops such that on contact they form a hook-and-loop bond. Such hook-and-loop fasteners are well known in the art
30 and include those sold under the Velcro® brand.

The container (1) is assembled by inserting the base end (6) of the pouch (2) into the top opening (13) of the sleeve (10) and then sliding the sleeve upwards until the strap (16) contacts the base of the pouch (2). The flaps (12a and 12b) are then folded around the
35 dispensing end (5) of the pouch (2) and secured in place by mating of the respective the attachment areas (14a with 15a and 14b with 15b). Thus as shown in Figure 3, in the

assembled container (1), the flaps (12a and 12b) snugly retain the dispensing end (5) such that when the container is inverted for dispensing, the pouch (2) does not fall out of the sleeve (10).

- 5 Dispensing is best achieved by a user gripping the sleeve in the vicinity of the dispensing end (5) and the base end (6) and rolling the base end (6) upwards and inwards towards the dispensing end (5).

After dispensing, the attachment areas (14a, 15a, 14b, 15b) can be unfastened simply by
10 pulling the flaps (12a, 12b) outwards. The pouch (2) can then be slid upwards and out of the sleeve (10) without the product outlet (8) coming into contact with the sleeve (10). The pouch (2) can then be placed in a freezer for storage. On removal of the pouch (2) from the freezer for the next dispensing occasion, the container (1) is then reassembled by applying the sleeve (10) to the pouch (2) as described above, thus preventing the user from having
15 to touch the very cold outer wall (4) of the pouch (2) during dispensing.

A second embodiment of a container (101) according to the invention is shown in Figure 4. In this embodiment the product outlet (108) of the pouch (102) is bonded to the centre of the outlet end (105) of the pouch (102). The sleeve (110) extends down from a collar (112)
20 to a base opening (118). In this embodiment the base opening (118) does not comprise a retaining strap and does not completely cover the base end (106) of the pouch (102) but provides sufficient coverage to protect the hand of a user applying manual force to the dispensing end (106). The container (101) of this embodiment is less preferred than that shown in Figures 1 to 3 as in this case, in order to assemble the container, the pouch (102)
25 must be inserted into the base opening (118) of the sleeve (110) with the product outlet (108) entering first and then travelling all the way through the sleeve (110) until the dispensing end (105) is retained by the collar (112). Thus when the reverse procedure is performed to remove the sleeve (110), the product outlet (108) and any residual frozen confection thereon, may contact the inside of the sleeve (110) and be deposited thereon.

30

A third embodiment of a container (201) according to the invention is shown in Figure 5. In this embodiment the pouch (202) is identical to that shown in Figure 4 but the sleeve (210) extends from a top opening (213) which, in the assembled container is disposed at the dispensing end (205) of the pouch (202) and does not have a bottom opening. Extending
35 from the top opening (213) is a retaining loop (212) that can be looped over the dispensing

end (205) of the pouch (202). The container (201) of this embodiment is less preferred than that shown in Figures 1 to 3 as although in this case the container is assembled by first sliding the base end (206) of the pouch through the top opening (213) of the sleeve, the retaining loop (212) may still contact the product outlet (208) when being attached or removed from the outlet end (205).

The present invention will now be described, by way of example only, with reference to the following Examples.

EXAMPLE 1

Two ice creams were formulated with varying ice contents (as calculated at -18 °C) and erythritol amounts as shown in Table 1 (amounts in % w/w).

TABLE 1

	1	2
Coconut oil	8.00	8.00
Skimmed milk, powder	4.15	4.15
Whey protein, concentrate (30%)	2.73	2.73
Low Fructose Corn Syrup (63 DE)	11.03	10.41
Dextrose monohydrate	16.73	15.80
Sucrose	1.91	1.81
Erythritol	1.58	2.3
Gums	0.30	0.30
Kappa Carrageenan	0.02	0.02
Monodiglyceride	0.33	0.33
Flavour	0.28	0.28
Colour	0.01	0.01
Water	to 100	to 100

The properties of the formulations are shown in Table 2.

TABLE 2

	1	2
Ice Content (%w/w)	36	37
Freezing Point Depressants (% w/w)	31	30
$\langle M \rangle_n$ (g mol ⁻¹)	214	212
Erythritol (%w/w)	1.6	2.3

5

The ice creams were prepared by pasteurizing and homogenizing mixes prepared according to the above formulations. The mixes were aged at 4 °C overnight before freezing and aerating in a scraped surface heat exchanger (standard ice cream freezer). The air input to the freezer was controlled to give a target overrun of 100% (actual overrun varied between 92 and 110%). Freezing was controlled to give a target extrusion temperature of -7 °C (actual extrusion temperature varied between -6 and -9 °C).

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The mixes were extruded directly into commercial food-grade pouches similar to the pouch shown in Figure 1. The pouch wall material was a laminate film comprising polyethylene terephthalate, aluminium, oriented polyamide and polyethylene. The product outlet was a spout with an internal diameter of 22 mm. The capacity of each pouch was 750 ml. An amount of 425 g of ice cream was filled into each pouch through the spout and then a closure cap screwed in place. The pouches were then hardened in a blast freezer and then transferred to a domestic freezer (-18 °C) for several days before use.

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When the pouches were removed from the freezer, they were found to be extremely cold to the touch such that they could be held only for a few seconds before becoming uncomfortable to handle.

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On the other hand, by applying sleeves to the pouches as shown in Figures 2 and 3, the pouches could be comfortably handled for several minutes. The sleeves were made from 1 mm thick foamed neoprene sandwiched between Lycra™ fabric and could easily be removed from and reattached to a pouch multiple times.

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Claims

1. A container for dispensing a frozen confection, the container comprising:

- a flexible pouch comprising a wall delimiting a cavity containing the frozen confection and extending from a base end to a dispensing end of the pouch, wherein the dispensing end comprises a product outlet through which the frozen confection can be extruded from the cavity; and
- a removable sleeve at least partly surrounding the wall of the pouch and being sufficiently flexible to allow transmission of manual force through the sleeve to deform the wall at least at the base end of the pouch and thereby urge the frozen confection in the cavity towards the outlet and be extruded therefrom and wherein the sleeve has a retaining part releasably engaging the dispensing end of the pouch to retain the pouch within the sleeve during extrusion of the frozen confection through the product outlet.

2. The container as claimed in claim 1 wherein the sleeve is a thermally-insulating sleeve.

3. The container as claimed in claim 2 wherein the sleeve comprises neoprene.

4. The container as claimed in any one of the preceding claims wherein the sleeve surrounds at least 80% of the external surface area of the wall.

5. The container as claimed in any one of the preceding claims wherein the sleeve is flexible such that it is not self-standing.

6. The container as claimed in any one of the preceding claims wherein the sleeve completely envelops the base end of the pouch.

7. The container as claimed in any one of the preceding claims wherein the sleeve comprises an opening disposed towards the dispensing end and through which the base end of the pouch can be inserted prior to engaging the retaining part to the dispensing end of the pouch.

8. The container as claimed in any one of the preceding claims wherein the frozen confection comprises freezing point depressants in an amount of from 25 to 35% by weight of the frozen confection, wherein the number average molecular weight $\langle M \rangle_n$ of the freezing point depressants is less than 250 g mol^{-1} .

9. The container as claimed in claim 8 wherein the freezing point depressants comprise erythritol.

5 10. A method for dispensing a frozen confection comprising:

(a) assembling a container by a procedure comprising the steps of:

i. providing a flexible pouch comprising a wall delimiting a cavity containing the frozen confection and extending from a base end to a dispensing end of the pouch, wherein the dispensing end comprises a product outlet through which the frozen confection can be extruded from the cavity;

10 ii. providing a removable sleeve having an opening and a retaining part;

iii. inserting the pouch through the opening such that the sleeve at least partly surrounds the wall of the pouch; and

iv. engaging the retaining part to the dispensing end of the pouch;

15 and

(b) applying manual force to the sleeve of the container to deform the wall at least at the base end of the pouch and thereby urge the frozen confection in the cavity towards the outlet and extrude at least a portion of frozen confection therefrom whilst the retaining part retains the pouch within the sleeve.

20 11. The method as claimed in claim 10 wherein steps (a)iii and iv comprise inserting the base end of the pouch through the opening and then engaging the retaining part to the dispensing end of the pouch.

25 12. The method as claimed in any one of claims 10 or 11 wherein the sleeve is removed from the pouch following dispensing of a portion of the frozen confection.

13. The method as claimed in claim 12 wherein the container is reassembled and a further portion of the frozen confection is then extruded therefrom.

30 14. The method as claimed in claim 13 wherein between dispensing the portions of the frozen confection, the pouch is stored in a freezer at a temperature of less than -10 °C.

35 15. The method as claimed in any one of claims 10 to 14 wherein the assembled container is as claimed in any one of claims 1 to 9.

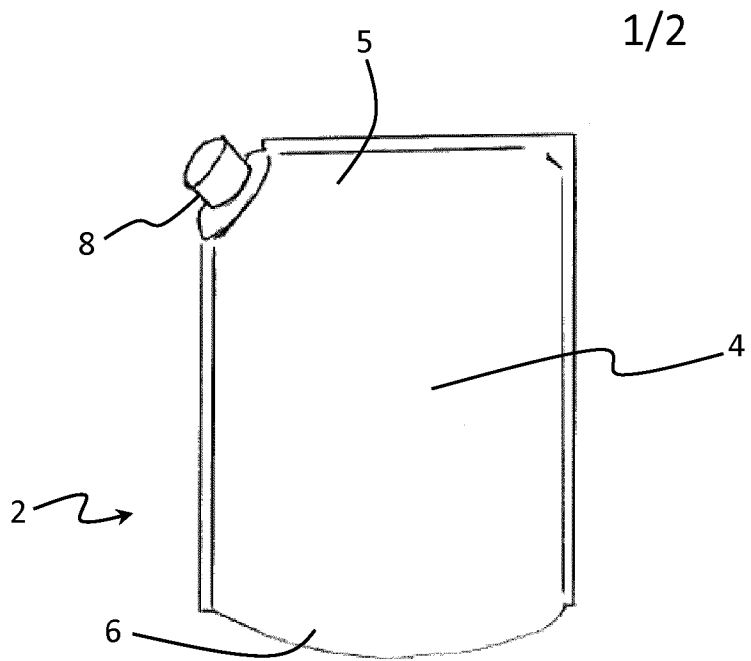


Fig. 1

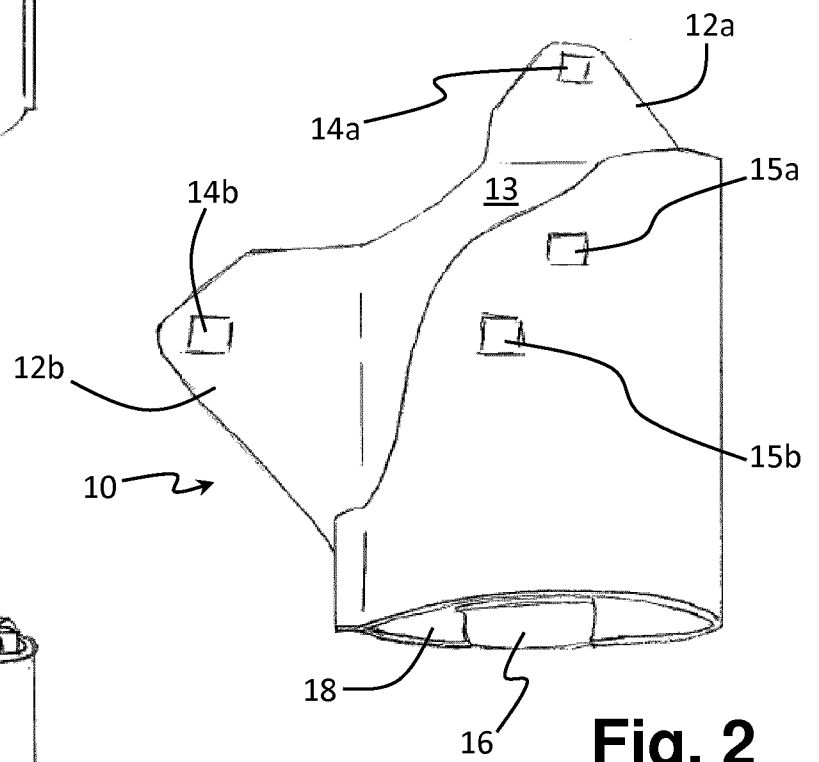


Fig. 2

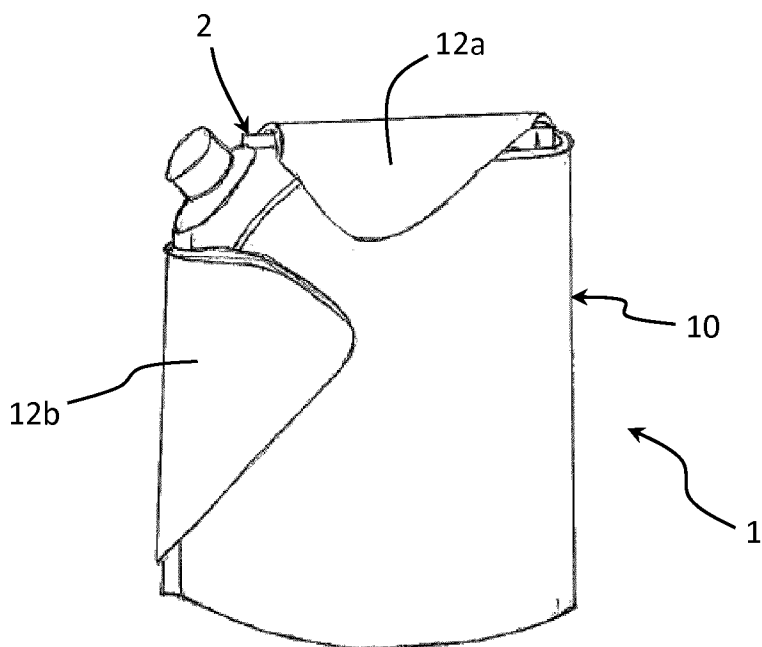


Fig. 3

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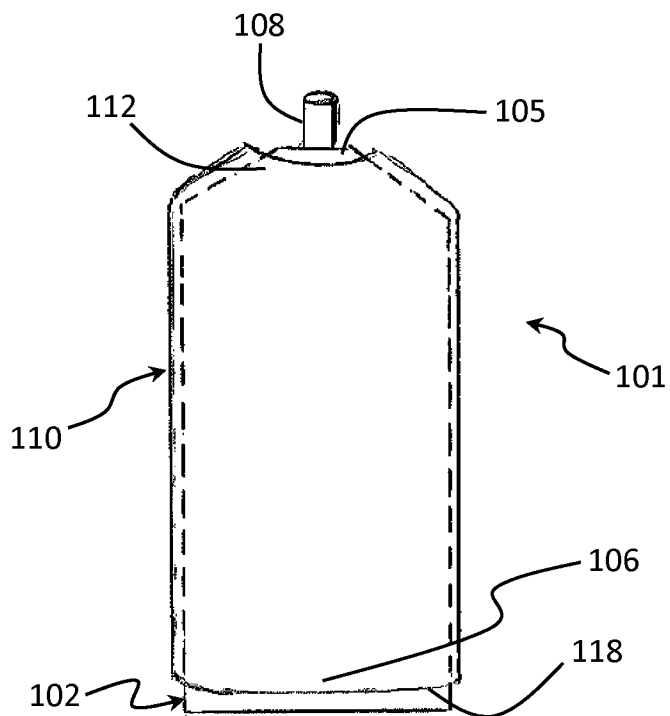


Fig. 4

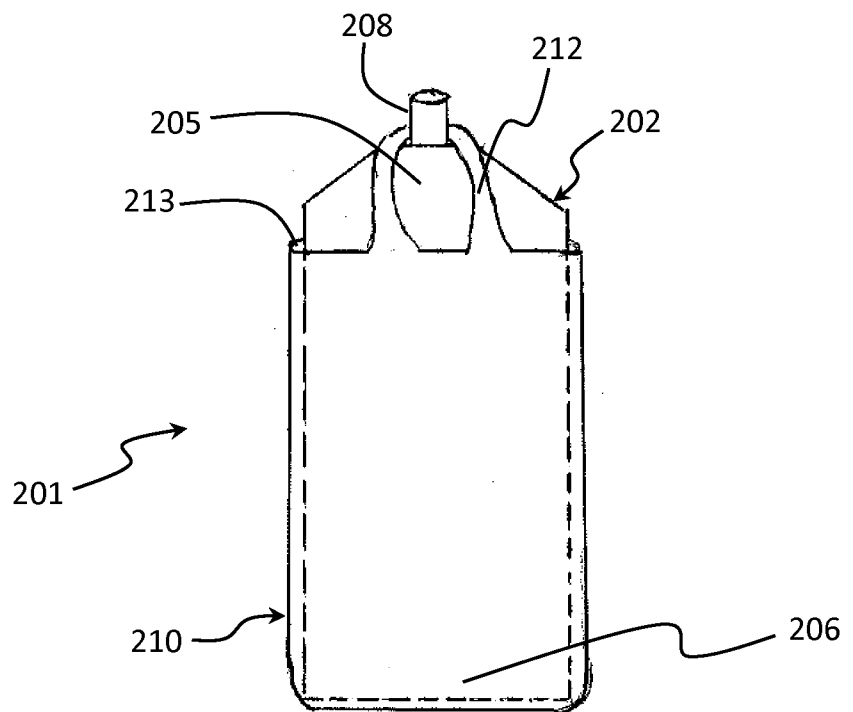


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/063713

A. CLASSIFICATION OF SUBJECT MATTER
INV. A23G9/28 B65D33/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23G B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	paragraph [0001] - paragraph [0002] paragraph [0005] - paragraph [0006] paragraph [0010] paragraph [0013] - paragraph [0017] paragraph [0020] paragraph [0026] paragraph [0070] paragraph [0087] paragraph [0100] paragraph [0127] paragraph [0138] paragraph [0141] figure 1 ----- -/-	10-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

24 July 2018

Date of mailing of the international search report

31/07/2018

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2018/063713

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	column 1, line 13 - line 15 column 2, line 47 - line 59 column 3, line 8 - line 34 column 5, line 24 - line 28 column 10, line 61 - line 68 figure 13	2,10-15
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Information on patent family members

International application No

PCT/EP2018/063713

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