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(71) **Applicant** *(for AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, IN, KE, KN, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SC, SD, SG, SL, SZ, TT, TZ, UG, VC, ZA, ZM, ZW only)*: **UNILEVER PLC** [GB/GB]; Unilever House, 100 Victoria Embankment, London, Greater London EC4Y 0DY (GB).

(71) **Applicant** *(for all designated States except AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, IN, KE, KN, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SC, SD, SG, SL, SZ, TT, TZ, UG, US, VC, ZA, ZM, ZW)*: **UNILEVER N.V.** [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL).

(71) **Applicant** *(for US only)*: **CONOPCO, INC., D/B/A UNILEVER** [US/US]; 800 Sylvan Avenue, AG West, S. Wing, Englewood Cliffs, New Jersey 07632 (US).

(72) **Inventors**: **BINLEY, Gary, Norman**; Unilever R&D Colworth, Sharnbrook, Bedford, Bedfordshire MK44 1LQ (GB). **SHAO, Zhimin**; Walls (China) Co., Ltd. Shanghai Branch, 66 LinXin Road, Linkong Economic Development Zone, Changning District, Shanghai 200335 (CN).

(74) **Agent**: **WARNER, Guy, Jonathan**; Unilever PLC, Unilever Patent Group, Colworth House, Sharnbrook, Bedford, Bedfordshire MK44 1LQ (GB).

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(54) **Title**: APPARATUS AND PROCESS FOR PREPARING FROZEN CONFECTIONERY PRODUCTS

(57) **Abstract**: An apparatus for producing frozen confectionery products is provided, the apparatus comprising: means for supplying a frozen confection to the inlets of a nozzle; the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures; the apertures having a width of from 1 to 5mm and a length of at least 10mm; means for moving the nozzle in the opposite direction to the direction of extrusion. A process for producing frozen confectionery products, the process comprising: supplying a frozen confection to a nozzle, the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures; wherein the apertures have a width of from 1 to 5mm and a length of at least 10mm; extruding the frozen confection from the chamber of the nozzle through the apertures of the extrusion plate; and simultaneously moving the nozzle in the opposite direction to the direction of extrusion; and stopping the flow of the frozen confection is also provided.

APPARATUS AND PROCESS FOR PREPARING FROZEN CONFECTIONERY PRODUCTS

Technical Field of the Invention

The present invention relates to an apparatus and process for producing frozen confectionery products, more particularly a process for preparing frozen confectionery products having interesting decorative shapes with fine detail.

Background to the Invention

Ice cream cone products, such as Cornetto™ are popular and well-known. These products typically consist of a wafer cone filled with ice cream. Consumers are continually looking for new eating experiences, and conventional cone products may be perceived as somewhat old-fashioned and uninteresting. For example, they have a familiar shape with small flutes on the top of the ice cream.

It is known to fill containers, such as cones, by extruding ice cream from a nozzle which moves in the opposite direction relative to the direction of extrusion. For example, in the industrial production of cone products, such as Cornetto™, the cone is filled by a nozzle which is located inside the cone at the start of dispensing, and which moves up as the cone is filled. This ensures that the ice cream goes all the way to the bottom of the cone. US 4 942 910 discloses a process for making shaped frozen confections in which a nozzle moves simultaneously in a circular path in the horizontal plane, and linearly in the vertical direction, so that the overall motion is in a spiral path. This produces a shaped frozen confection.

Nonetheless, there remains a need for an improved method for producing frozen confection products which have an attractive and appealing appearance, in particular with fine detail.

Brief Description of the Invention

We have now devised an apparatus and method which overcomes these problems. Accordingly, in a first aspect, the present invention provides an apparatus for producing frozen confectionery products, the apparatus comprising

- means for supplying a frozen confection to the inlets of a nozzle;
- the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures;
- the apertures having a width of from 1 to 5mm and a length of at least 10mm;
- means for moving the nozzle in the opposite direction to the direction of extrusion.

In a second aspect, the present invention provides a process for producing frozen confectionery products, the process comprising

- supplying a frozen confection to a nozzle, the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures; wherein the apertures have a width of from 1 to 5mm and a length of at least 10mm;
- extruding the frozen confection from the chamber of the nozzle through the apertures of the extrusion plate; and
- simultaneously moving the nozzle in the opposite direction to the direction of extrusion; and
- stopping the flow of the frozen confection.

Preferably the speed of motion of the nozzle is the same as the speed of extrusion of the ice cream.

Preferably the apertures have a width of from 2 to 4mm, such as about 3mm.

Preferably the frozen confection is extruded into a receptacle, such as a cup, tub or cone.

Description of Drawings

Figure 1 shows a nozzle including an extrusion plate with a single long, thin aperture in the form of a heart shape.

Figure 2 shows a cross section of an embodiment of the extrusion plate with further openings between the apertures of the plate.

Figure 3 shows examples of products which can be produced by the apparatus and method of the present invention.

Figure 4 shows further examples of products which can be produced by the apparatus and method of the present invention.

Detailed Description of the Invention

The narrow apertures of the apparatus result in thin streams of frozen confection which produce a fine extrusion pattern. We have found that if the nozzle remains stationery during extrusion, these streams are deformed by the frozen confection which follows. However, by moving the nozzle in the opposite direction to the flow of frozen confection, well-defined, highly decorative shapes are produced. Once the shape has been formed, the flow of the frozen confection is stopped, typically by means of a valve.

The products produced may consist of ice cream or other frozen confection in receptacles such as cups, tubs or cones. The volume of frozen confection dispensed in each operation is preferably from 30 to 300ml, preferably from 50 to 200ml, such as about 100ml.

This process can produce very attractive decoration on the top surfaces of cone, cup and tub products. The shapes that can be produced consist of thin walls of frozen confection which are arranged to form shapes – for example a spiral, a rose or a tulip, as shown in Figure 3. The precise appearance is controlled by the size, shape and location of the apertures in the extrusion plate and the dosing volume and flow rate of the frozen confection. For example, for a given extrusion plate and speed of motion of the nozzle, increasing the flow rate of the ice cream results in a product having wider features.

In order to retain the shape formed during extrusion, the walls should not be so thin that they collapse under their own weight. Thus high walls need to be thicker. Also, in order to retain the shape formed during extrusion, the frozen confection is preferably at a temperature of -5°C or below on extrusion. Frozen confections which contain low amounts of fat are preferably extruded at lower temperatures, such as -7°C or below.

In a preferred embodiment of the invention the extrusion plate of the apparatus has further openings between the apertures. These openings are connectable to means for forcing a gas from these further openings. Such an embodiment is shown in Figure 2 where the further openings 1 communicate with an air passage 2 which is connectable to the means for forcing a gas into this air passage 2 and hence from the further openings 1. In operation, this ability to force a gas, such as air, from these further openings serves to keep the various streams of the extruded confection separate from one another and allows for the production of particularly detailed products with delicate designs which are akin to the petals of a flower.

A single nozzle can be used to fill a single receptacle. Alternatively an array of nozzles can be used to decorate the surface of a larger product (such as a 1 litre tub) with multiple portions.

Examples

Figures 3 and 4 show products formed using the apparatus and the process of the invention. It can therefore be readily seen that the present invention is capable of providing extruded ice cream products with very fine and detailed decorative finishes to their surfaces.

Claims

1. An apparatus for producing frozen confectionery products, the apparatus comprising
   - means for supplying a frozen confection to the inlets of a nozzle;
   - the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures;
   - the apertures having a width of from 1 to 5mm and a length of at least 10mm;
   - means for moving the nozzle in the opposite direction to the direction of extrusion.

2. An apparatus according to claim 1 further comprising openings between the apertures, the further openings being connectable to means for forcing a gas from these further openings.

3. An apparatus according to claim 1 or claim 2 wherein the apertures have a width of from 2 to 4mm.

4. A process for producing frozen confectionery products, the process comprising
   - supplying a frozen confection to a nozzle, the nozzle comprising a chamber and an extrusion plate, wherein the extrusion plate defines one or more apertures; wherein the apertures have a width of from 1 to 5mm and a length of at least 10mm;
   - extruding the frozen confection from the chamber of the nozzle through the apertures of the extrusion plate; and
   - simultaneously moving the nozzle in the opposite direction to the direction of extrusion; and
   - stopping the flow of the frozen confection.

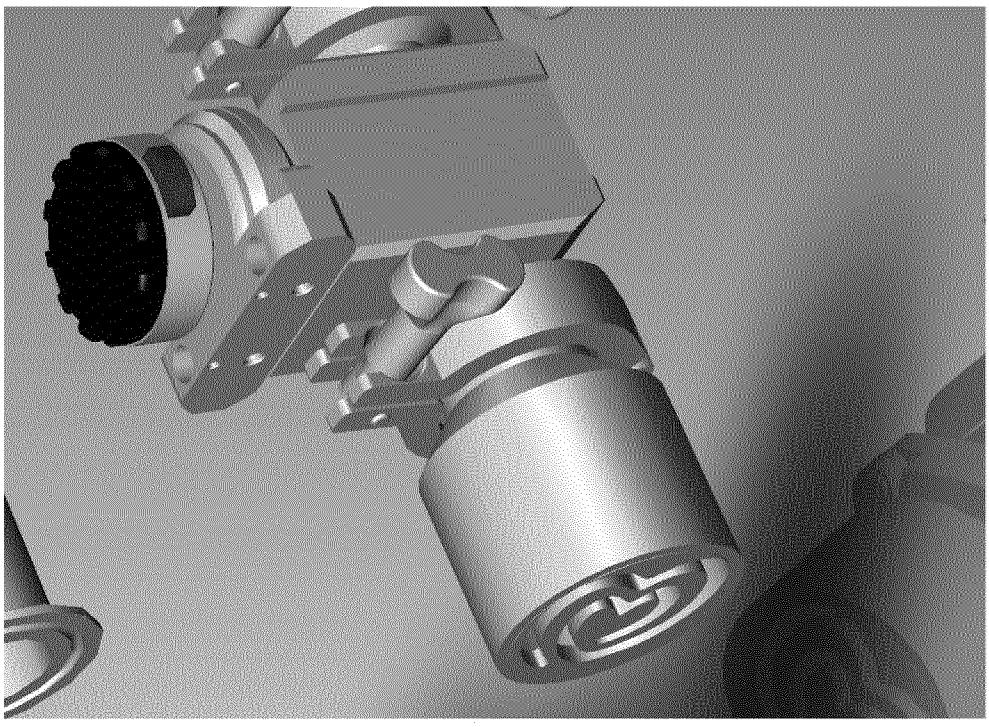
5. A process according to claim 4 wherein the speed of motion of the nozzle is the same as the speed of extrusion of the ice cream.

6. A process according to claim 4 or claim 5 wherein the frozen confection is extruded into a receptacle, such as a cup, tub or cone.

7. A process according to any of claims 4 to 6 wherein a gas, preferably air is forced from further openings located between the apertures of the extrusion plate.

8. A process according to any of claims 4 to 7 wherein the frozen confection is extruded at a temperature of -5°C or below.

Figure 1



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Figure 2

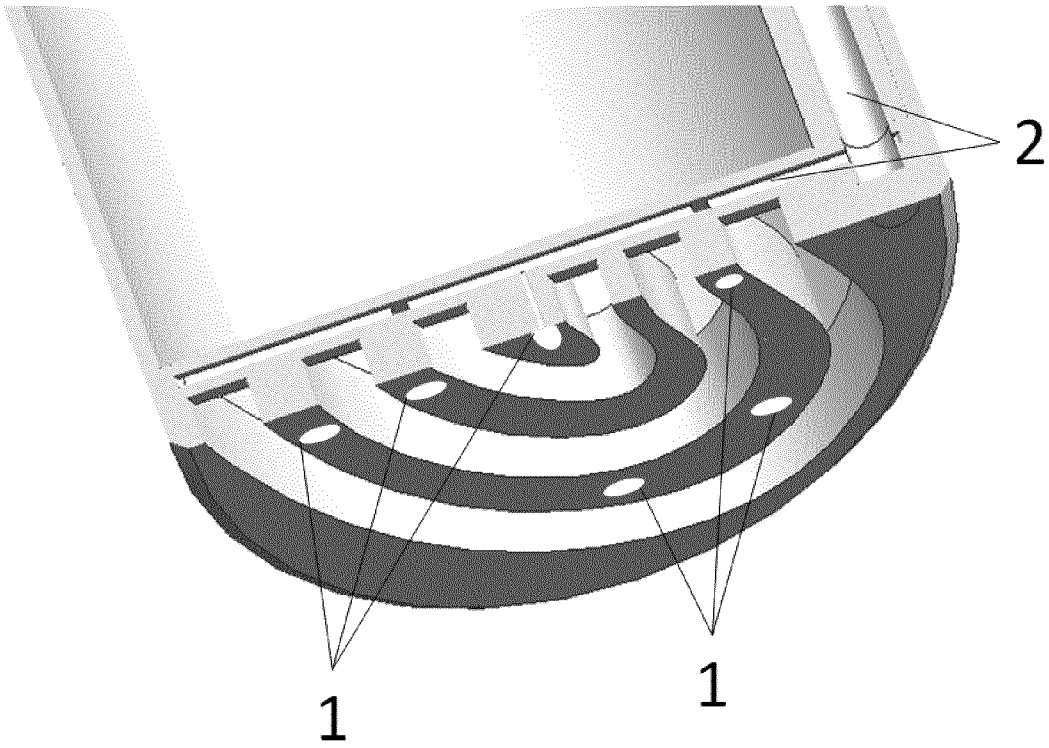


Figure 3



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Figure 4



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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A23G9/28
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

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, FSTA, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EP 2 177 109 A2 (NESTEC SA [CH]) 21 April 2010 (2010-04-21) paragraphs [0009] - [0024], [0034], [0049], [0071] - [0098]; claims; figures	1-8
X	US 2003/160073 A1 (GISPERT CASINO JUAN [ES] ET AL GISPERT CASINO JUAN CARLOS [ES] ET AL) 28 August 2003 (2003-08-28) page 3 - page 10; claims; figures	1-8
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Bondar, Daniela

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International application No
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International application No
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