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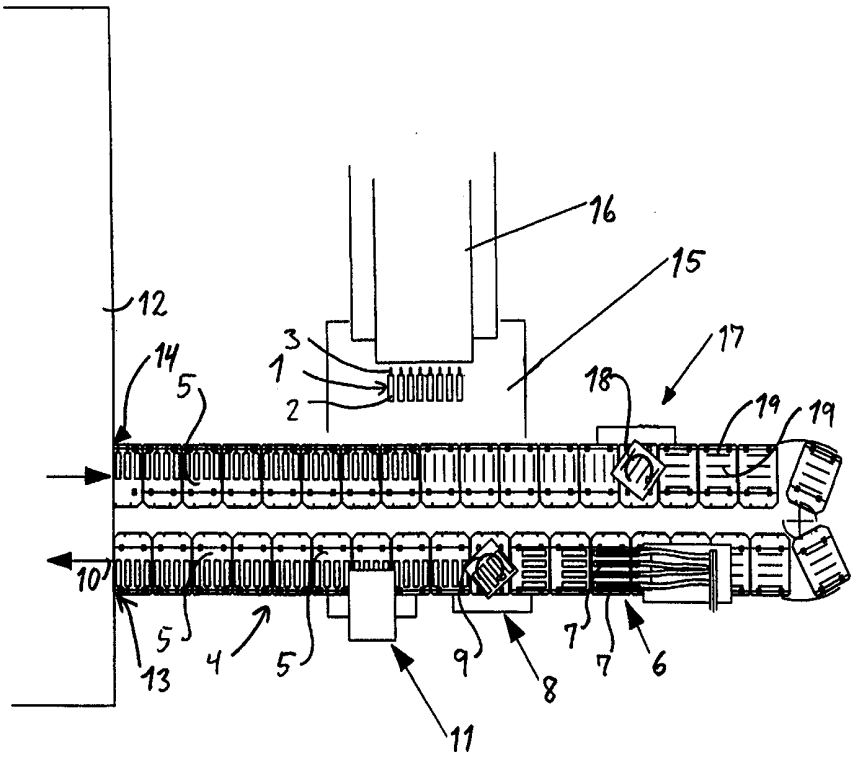
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(54) Title: A METHOD AND AN APPARATUS FOR MAKING CONFECTIONERY PRODUCTS WITH STICK

(57) Abstract

There is described a method making it possible to produce confectionery products (1) consisting of confectionery bodies (2) and a stick (3). These confectionery products may be produced with a very great length as they are made by horizontal extrusion whereby the products are distributed on a continually driven tray conveyor (4) with the confectionery mass oriented in the direction of movement (10) of the trays (5). The confectionery products are rotated 90° about a vertical axis whereby a well–known stick inserter (11) may be used for a horizontal pressing in of sticks (3) in the confectionery products (2). The confectionery products are thereafter conveyed to a freezing tunnel (12). After the freezing, the products may be removed by a robot (15) known per se, and which moves the frozen ice cream products (1) to the processing or packing. Because of the horizontal extrusion, it is possible to make very long ice cream products with a large degree of freedom with ice cream mass or water ice and with flavouring additives.



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A METHOD AND AN APPARATUS FOR MAKING CONFECTIONERY PRODUCTS WITH STICK

The present invention relates to a method for making confectionery products with stick, wherein a run of continuously extruded confectionery mass is cut into separate confectionery products distributed on trays on a continuously driven tray conveyor which moves the products through a device for hardening the confectionery mass, wherein the continually extruded confectionery mass is distributed oriented in the direction of movement of the trays, wherein the confectionery products are rotated 90° about a vertical axis as the trays, on which said products are laid down, are rotated, wherein sticks are pushed into the confectionery products before they are moved through the hardening step, and wherein the hardened confectionery products provided with sticks are removed from the conveyor for further treatment, preferably packing.

The invention also relates to an apparatus for making confectionery products with stick in the form of ice cream products by the method according to the invention, comprising an extruder, a cutting device for making a sharp cut through the extruded run, a tray conveyor, a freezing tunnel, a stick inserter for horizontally pushing in sticks in the formed products, means for removing the frozen ice-lollies from the conveyor, wherein the extruder is designed to be slided in the longitudinal direction of the conveyor, wherein the trays of the conveyor are arranged to be rotated about a vertical axis perpendicular to the top side of the tray, and where the trays are arbitrarily provided with recesses for receiving the extruded ice cream products.

The invention especially relates to the making of confectionery products in the form of ice cream products. However, the invention may also be used in connection with the making of other confectionery products provided with stick, for example lollipops. However, the presenting of the problem and the advantages of the invention will be explained specifically with respect to the making of an ice cream product.

In making ice-lollies, it is known that vertical extrusion allows much freedom with respect to designing the formed product. Thus, there will be a great degree of freedom

in forming an extrusion nozzle. It is possible to make ice-lollies having very complicated shapes, as for example ice-lolly figures containing one or more colours, ice cream with different flavours added, water ice products, or combined products containing ice cream and water ice.

The vertically extruded ice cream products may be produced with and without an inserted stick. Thus, it will be possible to extrude the products in cups.

The products made by vertical extrusion are, however, connected with certain limitations. The products will, when extruded on a conveyor in a horizontal plane, be limited by two parallel, horizontal surfaces. These horizontal surfaces occur when the vertical run is cut by means of a wire moved perpendicularly on the run. The product cut off thus falls down on the conveyor by the cutting. In these parallel surfaces, there may occur small deviations stemming from the pushing in or inserting of a stick in the formed confectionery products and because of possible differences in flow if two or more different ice creams are extruded.

The confectionery product is made by cutting off at the extrusion nozzle a run of continual, vertically extruded ice cream mass and then placing it on a running conveyor belt below. Because the cutting off of the formed run of extruded confectionery mass takes place perpendicularly to the direction of extrusion, it will not be possible to make such products with a relatively short length and a symmetric round form.

There is a demand for ice cream products with great length, and wherein the formed ice cream product is composed of different types of ice creams and water ice, and wherein different patterns are formed over the length of the product. This need cannot be fulfilled by the vertical extrusions.

It is also known to extrude an ice cream product by horizontal extrusion of a run of ice cream which is cut off and distributed on a continually driven conveyor. This type of extrusion allows a certain degree of freedom in shaping the products in the direction of extrusion. It will be possible to give the product different sectional shapes with one or

more colours of ice cream placed side by side as seen in the longitudinal direction/the direction of extrusion of the formed product. It will also be possible to rotate the nozzle or the mouth of the extruder so that twisted products are produced. Also, it will be possible to move the whole extrusion head or extrusion mouth to and fro in the direction of extrusion or sideways relative to the direction of extrusion so that wave-like products are formed. By this method of extrusion the degrees of freedom for forming the product are greater.

By the horizontal extrusions of the ice cream product, said ice cream products are formed lying horizontally on the trays and will be without sticks. The product made by the horizontal extrusion is thus commonly known as an ice bar. This product is not advantageous as it is not provided with a stick which is often desired in order to have a firm grip in the finished ice cream product.

Because of the orientation of the ice bars in the longitudinal direction of the conveyor, it is not possible to insert or push in sticks in these products.

There is also known a form of horizontal extrusion making possible insertion of sticks in the formed ice cream body. In practice, however, it has turned out to be necessary by this system to utilise a rotating extrusion head for the formed ice cream product to keep its shape. When the first run of ice cream has left the extrusion nozzle, a stick is inserted in the end part. After this insertion of the stick, it will be necessary to support the product. Thus, a support is inserted under the stick. This support has to follow the speed of extrusion of the extruder and therefore it is difficult to control. When a cutting of the run takes place to achieve the desired length of the confectionery, the finished product falls down on the conveyor moving the product through a subsequent freezing tunnel.

In order that the product is not damaged, it is necessary with a synchronous cutting off and removal of the support under the inserted stick. This synchronisation is difficult and the making is still disadvantageous, because of the fall of the product down on the conveyor. This makes the making of round items difficult. Even when there is formed

a recess in the tray to ensure roundness in the product, the method will be difficult to practice. It will thus be difficult to get the cut off product to hit precisely in a recess by the extrusion process.

Furthermore, the formed product is disadvantageous as it necessarily will be short and has to be made with a rotation of the extrusion nozzle for the product to be self-supporting. If the product is made without rotation of the extrusion nozzle, the product will necessarily be very short.

There is also known a way where the ice cream product by horizontal extrusion is extruded on turn tables mounted on the trays in a tray conveyor. The turn tables may rotate about a vertical axis. A run of extruded ice cream mass is extruded on the turn tables. This run is subsequently divided by pressing down a wedge and dividing the run into separate bodies each of a length corresponding to the width of the turn table. It is necessary that this wedge deforms the formed run to be able to perform a subsequent rotation that places the products transversely to the direction of transport for the insertion of a stick. The products made by this method may thus only be produced with lengths defined by the turn table. Furthermore, it is difficult to make these products with a uniform shape because of the deformation performed by the division of the run in separate ice cream bodies on each turn table.

The Danish publication No. 158.125 discloses an apparatus for making ice which is extruded vertically on trays on a conveyor. The ice mass is extruded continually on the trays in the direction of movement of said trays, and the ice mass is cut off to the desired length, for example by use of a wire. Then the trays with the distributed run of ice mass are turned 90°. Hereby the ice mass becomes accessible for mounting sticks. Afterwards, the ices are frozen in a freezing compartment. In this apparatus there is a limitation to the degree of freedom for shaping ice cream products, because of the vertical extrusion of a run down on a horizontally movable conveyor. Furthermore, there is limitation in the formed products as these are extruded down into recesses in the conveyor.

The known methods for making ice cream products are thus all connected with limitation in the shape that the product may have. There is a wish to make products, be it ice cream products or other confectionery products, which are very long, for example with a length up to 400 mm which may be produced with an arbitrary length, and which may at the same time be round and simultaneously be produced with long throughgoing stripes or layers. There is also a desire for ice cream products that may be made of different types of ice cream and/or the different colours of ice cream, just as they may also contain water ice, stripes of juice, chocolate, and caramel and other edible pastas.

By the present invention there is indicated a method and an apparatus which make it possible to make a confectionery product meeting these demands.

According to the invention this is achieved by the method which is particular in that the steps wherein the extrusion is a horizontal extrusion, wherein there is extruded a desired length of confectionery product, whereafter the run is cut off, and wherein the extrusion nozzle is retracted a desired length depending on the desired length of the confectionery product for distributing a new run on a subsequent tray.

The apparatus according to the invention is characterised in that the extruder is a horizontal extruder having at least one nozzle, which arbitrarily is stationary, rotating, or oscillating.

By the present invention it has appeared to be possible to make ice cream products or other confectionery products with arbitrary lengths and with desired shapes by means of tray tunnels known per se and with horizontal extrusion of the ice cream products. The formed products have a uniform section over their entire lengths and are not deformed at the ends.

With the method and the apparatus according to the invention it becomes possible to manufacture long confectionery products with the degree of freedom achieved by the horizontal extrusion. When this is combined with rotation of the trays with the confectionery products provided thereon so that sticks may be inserted into the confec-

tionery products before the freezing, it becomes possible to make long confectionery products with sticks and with the degree of liberty achieved by the shaping of the products at the horizontal extrusion.

The extrusion is thus a horizontal extrusion which makes it very easy and simple to extrude products with a given sectional shape. As the products are moved slowly down on the tray by an extrusion head which is situated immediately over the tray, it will be possible to put the product down into a recess contributing to determine the profile of product at the underside. The length of the extruded product may be made very long as the length alone is determined by the width of the tray. As the trays with the cut off products placed on the substantially horizontal surface are rotated 90° about a vertical axis, the products will be rotated so that they are oriented transversely to the direction of movement of the trays. This makes possible a very simple and easy insertion or pressing in of sticks. Thus, it may be possible to use an insertion of sticks, typically for insertion of wooden sticks, of the kind used in connection with the making of vertically extruded ice cream products, where the sticks are pressed in a direction perpendicularly to the direction of transport.

After insertion of the sticks in the confectionery products, said products are moved into a freezing tunnel which also may be of a well known kind. When the products are moved out again, they may easily be removed from the trays by means of a robot known per se and transferred to a conveyor belt for further processing, for example for coating with chocolate or the like, or directly to packing.

If there is used trays with recesses, the trays will again be rotated 90° before they are again placed under the extruder. Thus, the recesses will be positioned correctly in relation to the subsequent extrusion of new confectionery products on the tray.

The method will make it possible to use a horizontal extruder with a head, which is stationary, rotating or oscillating. Thus, there is achieved very great degrees of freedom in the forming of the created products. The products may be made of ice cream, ice cream with different colours/flavouring additives, or with a combination of ice

cream and water ice. Trays used in a traditional freezing tunnel have different lengths, and it will be possible to make the confectionery products in lengths of between 100 and 400 mm, but especially with a length of 300 mm. Trays that are typically used in a freezing tunnel have a width of 300 mm. The formed product may be made with any desired sectional shape, e.g. circular, polygonal, star-shaped, oval or other shape. If they are made with circular shapes, they may be produced with diameters of between 10 and 70 mm, but other diameters are possible.

In the production, an extruder will usually have several extrusion nozzles so that on each tray, there are extruded several runs of confectionery mass placed side by side. The number of such runs may be between two and eight. Other numbers are also possible. The number of runs beside each other will primarily depend on the arrangement of the stick inserters used and on the means used for removing the frozen products from the tray conveyor.

The invention will be now be explained in detail with reference to the attached drawing, in which

Fig. 1 shows a schematic partial plane view for illustrating an apparatus for making confectionery products by a method according to the invention,

Fig. 2 is a partial schematic side view for illustrating the extrusion, and

Fig. 3 is a plane view of the extrusion illustrated in Fig. 2.

In Fig. 1, there is seen an apparatus for use in the making of ice cream products 1 which are constituted by an ice cream body 2 in which a stick 3 is inserted. The apparatus comprises a tray conveyor 4 with a number of trays 5 on which the ice cream products 1 are distributed. The apparatus comprises an extruder 6 extruding runs of ice cream mass 7 on the trays 5. This takes place by simultaneous extrusion of four runs of ice cream 7 placed side by side on the trays 5.

The apparatus also comprises a turning apparatus 8 disposed after the extruder 6. In this turning apparatus the trays 5 are rotated in a direction of the arrow 9 about a verti-

cal axis which is perpendicular to the horizontally oriented trays 5. The trays are rotated 90° so that the ice cream products 1 are rotated from their extruded orientation with a length in the direction of movement 10 of the conveyor to a position in which they are placed perpendicularly to the direction of transport 10.

The apparatus also comprises a stick inserter 11 placed after the turning apparatus 8. The stick inserter may be of a kind known per se which presses the sticks horizontally into the formed products. The tray conveyor 4 then moves the products into a freezing tunnel 12. The conveyor is moved into the freezing tunnel at the point 13 and out from the freezing tunnel 12 at the point 14 with the frozen ice cream products provided on the trays 5.

The apparatus furthermore comprises a robot 15 for removing the frozen ice cream products 1. In the shown embodiment, the robot 15 is arranged to remove eight ice cream products 1 at a time corresponding to the number of ice cream products situated on two trays 5 disposed side by side. The robot furthermore comprises a lamella belt 16 moving the products to further treatment or packing.

The apparatus comprises a further turning apparatus 17 which can rotate the trays 90° about a vertical axis according to an arrow 18. Hereby the trays are provided with the same orientation as the original. The further turning apparatus 17 is only necessary if there are used trays having recesses as indicated by 19. The recesses 19 serve to receive the frozen confectionery products so that they get the desired shape without being deformed because of a plane surface of the trays 5.

If the trays are made without recesses and there are produced ice cream products 1 with a polygonal section which may lie on a plane tray, the further turning apparatus 17 may be omitted. If the trays 5 have a length/width ratio necessitating passage through the freezing tunnel 12 with a specific orientation of the trays 5, the further turning apparatus 17 will be necessary.

The trays may be traditional trays used in tray conveyors having a width up to 400-500 mm. The trays will preferably have a length of about 300 mm. This makes possible the making of confectionery products in lengths of between 100 and 400 mm. The length of the formed ice cream product is thus only limited by the width of the trays 5. The products can be formed with a completely circular form with diameter between 10 and 70 mm, preferably of between 20 and 50 mm, and especially about 30 mm.

In Figs. 2 and 3 there are seen a more detailed side view and plane view, respectively, of the extruder 6. The extruder comprises extruding nozzles 20. In the shown embodiment, said extruding nozzles are provided in a number of four. The extruding nozzles 20 are connected with supply pipes 21,22 for supplying different kinds of ice cream and water ice. The ice cream run 7 leaving the nozzle 20 is cut off by means of a cutting apparatus 23. The cutting apparatus 23 comprises a wire 24 known per se and placed between two lateral pieces 25 which may be moved up and down by means of a pneumatic cylinder 26, thereby cutting the run 7. The cutting apparatus 23 is kept stationary. The extruder head 6 is oscillated to and fro in the direction of movement 10 of the conveyor in order to establish the desired length of the ice cream bodies. When a body 2 is cut off from the run 7, the extruder is retracted in order to created the desired distance between successive bodies 2, and thereby also to create the desired length of each body 2. This length may arbitrarily be varied when adjusting the stroke and speed of the extruder head 6, the speed of extrusion, and the speed of the conveyor. Hereby the desired ice cream bodies 2 are formed on the trays 5.

The formed ice cream bodies 2 have a considerable length which substantially corresponds to the width of the trays 5.

The nozzle 20 of the extruder is placed ata small angle 27 to horizontal. Extrusion may thus be performed as a horizontal extrusion. The angle 27 may be between 0 and 10°, but is preferably less than 5°. The lower corner 28 of the nozzle 20 is at a very short distance immediately above the surface 29 of the trays 5. This distance is dependent on a small turn-up edge 30 on the trays. The lower corner 28 of the nozzle may in principle be provided immediately over the surface 29 of the trays.

The horizontal extrusion by the method according to the invention may in principle be performed according to methods known from the making of so-called ice bars.

CLAIMS

1. A method for making confectionery products (1) with stick (3), wherein a run of continuously extruded confectionery mass (7) is cut into separate confectionery products (2) distributed on trays (5) on a continuously driven tray conveyor (4) which moves the products (1) through a device (12) for hardening the confectionery mass, where the continually extruded confectionery mass (7) is distributed oriented in the direction of movement (10) of the trays (5), wherein the confectionery products (1) are rotated 90° about a vertical axis as the trays (5) on which said products are laid down, are rotated, wherein sticks (3) are pushed into the confectionery products (2) before they are moved through the hardening step, and wherein the hardened confectionery products (1) provided with sticks are removed from the conveyor (4) for further treatment, preferably packing, c h a r a c t e r i s e d in the steps wherein the extrusion is a horizontal extrusion, wherein there is extruded a desired length of confectionery product, whereafter the run is cut off, and wherein the extrusion nozzle (20) is retracted a desired length depending on the desired length of the confectionery product (1) for distributing a new run on a subsequent tray.

2. A method according to claim 1, c h a r a c t e r i s e d in that the confectionery mass (7) is an ice cream mass and the hardening step is a freezing step.

3. A method according to claim 1 or 2, c h a r a c t e r i s e d in that the trays (5) before they are provided with new products are rotated 90° again so that all products (1) are extruded with equal orientation relative to the trays.

4. A method according to claim 1, 2 or 3, c h a r a c t e r i s e d in that the extrusion is arbitrarily performed with extruding means (6,20) stationary, oscillating, or rotating.

5. A method according to any one of the preceding claims, c h a r a c t e r i s e d in that the extrusion is performed with a combination of different confectionery products and/or confectionery products with different flavour additives.

6. A method according to claim 5, c h a r a c t e r i s e d in that the confectionery mass comprises a combination of ice cream and water ice or other edible pastas.

7. A method according to any one of the preceding claims, c h a r a c t e r i s e d in that the confectionery product is produced in lengths of between 100 and 400 mm, preferably of between 250 and 350 mm, and especially of 300 mm, and preferably with a circular form with a diameter of between 10 and 70 mm.

8. A method according to any one of the preceding claims, c h a r a c t e r i s e d in that the confectionery products are extruded in recesses (19) in the trays (5) corresponding to the desired contour of the finished products (1).

9. A method according to any one of the preceding claims, c h a r a c t e r i s e d in that there are extruded several runs of the confectionery mass (7) placed side by side on each tray (5).

10. An apparatus for making confectionery products (1) with stick (3) in the form of ice cream products by a method according to any one of the preceding claims, and comprising an extruder (6), a cutting device (23) for making a sharp cut through the extruded run (7), a tray conveyor (4), a freezing tunnel (12), a stick inserter (11) for horizontally pushing in sticks (3) in the formed products, means (15) for removing the frozen ice-lollies from the conveyor (4), wherein the extruder (6) is designed to be slided in the longitudinal direction of the conveyor (4), where the trays (5) of the conveyor are arranged to be rotated about a vertical axis perpendicular to the top side of the tray, and wherein the trays (5) are arbitrarily provided with recesses (19) for receiving the extruded ice cream products (1), c h a r a c t e r i s e d in that the extruder (6) is a horizontal extruder having at least one nozzle (20), which arbitrarily is stationary, rotating, or oscillating.

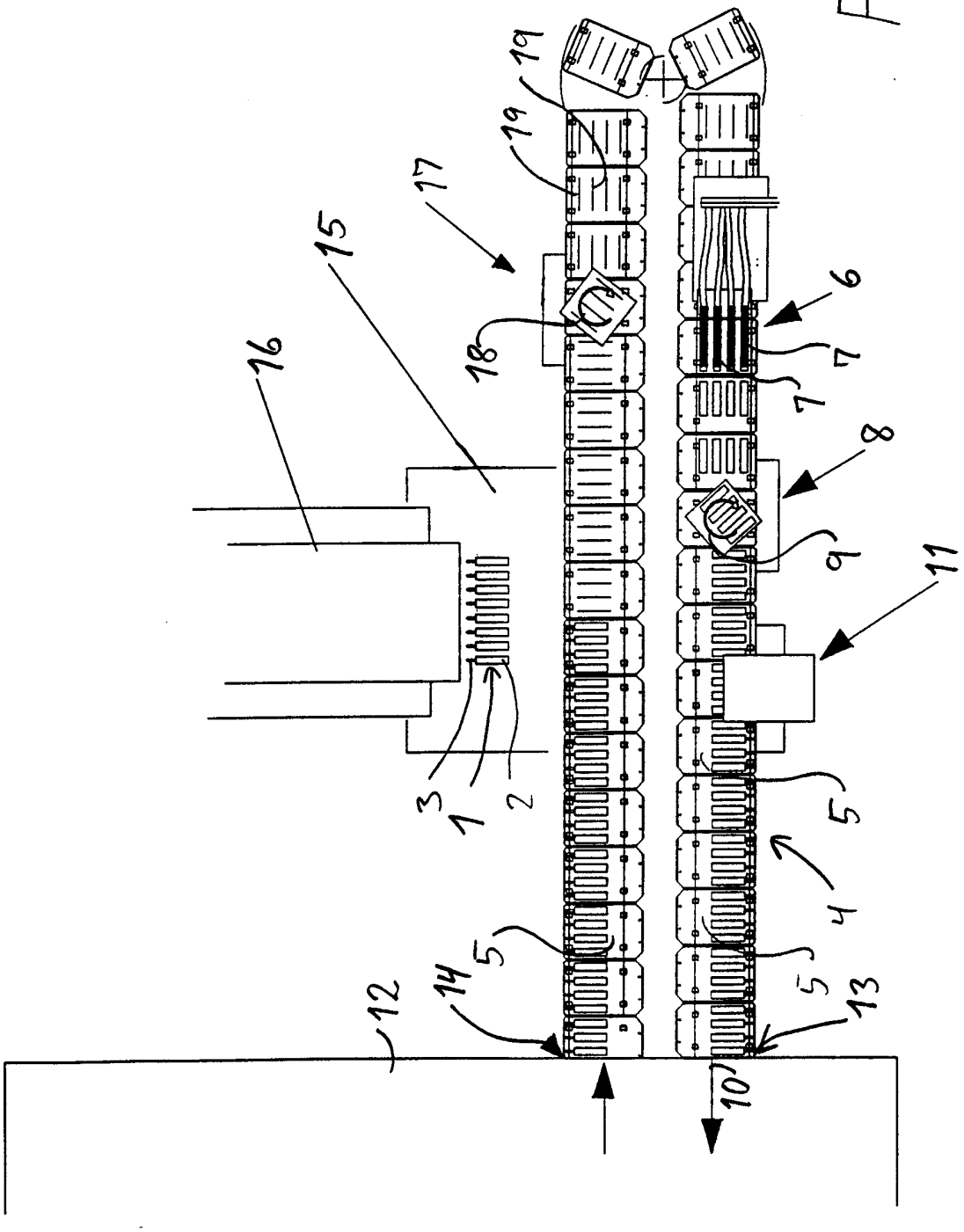


FIG. 1

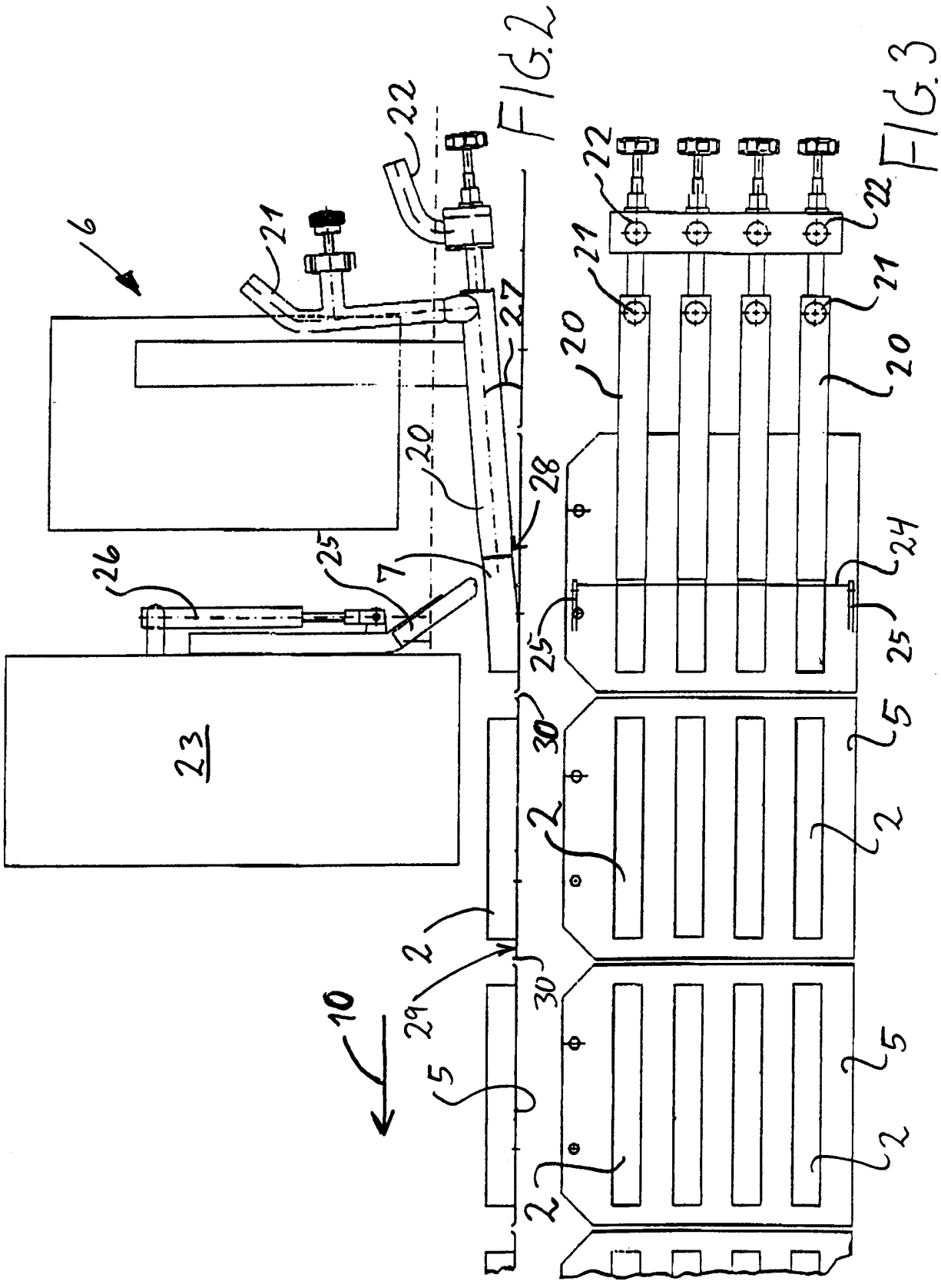


FIG.2

FIG.3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 98/00243

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A23G 9/14, A23G 9/26
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)

IPC6: A23G

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

SE,DK,FI,NO classes as above

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

WPI,EPODOC,PAJ,US FULLTEXT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 3817588 A1 (BROEDRENE GRAM A/S), 8 December 1988 (08.12.88), column 7, line 16 - line 17; column 8, line 24 - line 57, figures 1,2, abstract --	1,2
Y	SE 451529 B (O G HÖYER AS), 19 October 1987 (19.10.87), figure 1, abstract -- --------	1,2

☐ 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	Date of mailing of the international search report
10 November 1998	11 -11- 1998
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Wiva Asplund Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

05/10/98

International application No.
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