

DESCRIPTION

TITLE OF THE INVENTION: CONTINUOUS ICE CREAM PROCESSING DEVICE AND METHOD, AND ICE CREAM

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of frozen treat processing, and particularly, to a continuous ice cream processing device and method, and an ice cream.

BACKGROUND

[0002] With the development of society, people have higher requirements for ice creams. A traditional square ice cream structure is gradually unable to attract the attention of customers. In order to have higher market competitiveness, forms of ice cream products start to gradually change and develop towards complexity.

[0003] In order to develop new ice cream styles, a traditional way is to make molds. That is, ice cream liquid is poured into a corresponding mold. Although this processing method is simple, a large number of molds need to be prepared for mass production, resulting in relatively high processing costs. When a stacking manner is used for processing an ice cream with special shape, it often relies on human labor to process the ice cream. At this time, the ice cream is greatly affected by a temperature, causing a problem of difficult shape preservation. In addition, there is also a problem of difficulty in maintaining the consistency in the appearances of products during manual production.

[0004] In order to solve the above problems and reduce the processing costs of the mass continuous production of ice creams with special shapes, it is necessary to develop a new continuous ice cream processing device and method.

SUMMARY

[0005] The present disclosure aims to provide a continuous ice cream processing device and method, and an ice cream, so as to solve the technical problem in the prior art that it is hard to achieve industrial continuous production of ice creams with special stacked shapes. Many technical effects achieved by the preferred technical solutions among the multiple technical solutions provided by the present disclosure are described below in detail.

[0006] In order to achieve the forgoing purpose, the present disclosure provides the following

technical solution.

[0007] A continuous ice cream processing device provided by the present disclosure includes a conveyor line and a pleat discharge nozzle, wherein several trays are arranged on the conveyor line in sequence; and the pleat discharge nozzle is fixedly arranged above the conveyor line, and a discharge speed of the pleat discharge nozzle is greater than a running speed of the conveyor line.

[0008] An ice cream component extruded out of the pleat discharge nozzle falls onto the tray under the action of the gravity and is folded in a lengthwise direction of the tray to form a pleated structure.

[0009] The discharge speed of the discharge nozzle is greater than the running speed of the conveyor line, so that the quickly extruded ice cream component can be automatically folded under the action of the gravity after falling onto the tray, thus forming the special pleated structure. The trays are arranged on the conveyor line in sequence, so that the special pleated structure can be continuously formed on the trays along a conveying direction of the conveyor line as the conveyor line moves, thereby achieving quick and continuous production of frozen treats with special stacked shapes.

[0010] Based on the above technical solution, the present disclosure can further have the following improvements.

[0011] As a further improvement of the present disclosure, the pleat discharge nozzle is of a flat sheet structure; and the ice cream component extruded out of the pleat discharge nozzle is in a belt shape.

[0012] The specific shape of the above pleated structure is also affected by a shape of the pleat discharge nozzle in addition to being affected by the running speed of the conveyor line and the discharge speed of the pleat discharge nozzle. When the pleat discharge nozzle is of the flat structure, the extruded ice cream is in the belt shape with a certain width, and the entire formed pleated structure also has a certain width.

[0013] As a further improvement of the present disclosure, a discharge direction of the pleat discharge nozzle tilts towards a running direction of the conveyor line, and an angle between a straight line of the discharge direction of the pleat discharge nozzle and a straight line of the running direction of the conveyor line is less than 45°.

[0014] As a further improvement of the present disclosure, the angle is 30° to 35°.

[0015] The specific shape of the pleated structure can be adjusted by adjusting the angle.

[0016] As a further improvement of the present disclosure, a quantity of the pleat discharge nozzle is at least two; and distances between the different pleat discharge nozzles and the trays gradually increase in a conveying direction of the conveyor line.

[0017] The distance between the pleat discharge nozzles and the trays can affect a height of the pleated structure.

[0018] As a further improvement of the present disclosure, an additional discharge assembly is further arranged above the conveyor line; the additional discharge assembly includes at least one of a tiling discharge nozzle, a sprinkling discharge nozzle, and a discharge pump;

[0019] the tiling discharge nozzle is used for extruding the ice cream component, and the extruded ice cream component is tiled under the action of the gravity;

[0020] the sprinkling discharge nozzle is used for sprinkling a powder bulk material or a liquid material; and

[0021] the discharge pump is used for spraying the powder bulk material or the liquid material.

[0022] The additional discharge assembly can further decorate the above pleated structure in a stacking manner. Therefore, the device can use the above additional discharge assembly to process and make ice creams with different numbers of layers and of different structures.

[0023] As a further improvement of the present disclosure, the tiling discharge nozzle and/or the sprinkling discharge nozzle are located between two adjacent pleat discharge nozzles;

[0024] and/or, the discharge pump is arranged near a conveying tail end of the conveyor line.

[0025] As a further improvement of the present disclosure, a quantity of the tiling discharge nozzle is at least two, and the tiling discharge nozzles are arranged between two adjacent sprinkling discharge nozzles.

[0026] As a further improvement of the present disclosure, a cutting unit is arranged at a conveying tail end of the conveyor line; and the cutting unit cuts a material accumulated on the tray by taking the tray as a unit.

[0027] The present disclosure further provides a continuous ice cream processing method, including the above continuous ice cream processing device, and further including:

[0028] continuously extruding part of the ice cream component to the trays through the pleat discharge nozzles, wherein the ice cream component is stacked to form a pleated structure;

[0029] continuously extruding part of the ice cream component to the pleated structure through the tiling discharge nozzles to form a tiled structure;

[0030] sprinkling the powder bulk material or the liquid material onto the pleated structure or the tiled structure through the sprinkling discharge nozzles; and

[0031] spraying the powder bulk material or the liquid material through the discharge pump to the ice creams stacked on the trays.

[0032] By using the above processing method, ice creams with different structures can be made in the thickness direction of the product structure, which achieves continuous production of the ice

creams with the special pleated structures.

[0033] The present disclosure further provides an ice cream. The ice cream is made by using the above processing device, and includes a pleated layer, a tiled layer, a sprinkled layer, and a decorative layer, wherein

[0034] the two pleated layers are arranged at upper and lower sides in a thickness direction of the ice cream; the decorative layer is located on upper surfaces of the pleated layers and covers part of the pleated layers; the tiled layer and the sprinkled layer are arranged between the two pleated layers at an interval in the thickness direction of the ice cream; and

[0035] a quantity of the sprinkled layer is greater than a quantity of the tiled layer.

[0036] Compared with the prior art, the technical solutions provided by the preferred implementations of the present disclosure has the following beneficial effects.

[0037] The continuous ice cream processing device and method of the solutions achieve continuous production of the ice cream with the pleated structure, so that the problem that it is hard to make a complex shape for the traditional ice cream is solved. Meanwhile, mass production of ice creams with the above special shapes is also achieved, and the processing efficiency of the ice cream is effectively improved. In addition, the device can flexibly adjust the specific shape of the processed ice cream by controlling the quantity and arrangement positions of the discharge nozzles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] In order to describe the embodiments of the present disclosure or the technical solutions in the existing art more clearly, drawings required to be used in the embodiments or the illustration of the existing art will be briefly introduced below. Obviously, the drawings in the illustration below are only some embodiments of the present disclosure. Those ordinarily skilled in the art also can acquire other drawings according to the provided drawings without doing creative work.

[0039] FIG. 1 is a schematic structural diagram of a continuous ice cream processing device of the present disclosure;

[0040] FIG. 2 is a schematic diagram of arrangement of trays on a conveyor line in FIG. 1;

[0041] FIG. 3 is a front view of an ice cream the present disclosure; and

[0042] FIG. 4 is a side view of an ice cream the present disclosure.

[0043] In the drawings: 1: conveyor line; 2: tray; 3: pleat discharge nozzle; 4: tiling discharge nozzle; 5: sprinkling discharge nozzle; 6: discharge pump; 7: cutting unit; 10: ice cream; 11: pleated layer; 12: tiled layer; 13: sprinkled layer; and 14: decorative layer.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0044] In order to make the purposes, technical solutions and advantages of the present disclosure clearer, the technical solutions of the present disclosure will be described in detail below. It is apparent that the described embodiments are a part of the embodiments of the present disclosure, not all the embodiments. Based on the embodiments in the present disclosure, all other embodiments obtained by those of ordinary skill in the art without creative efforts shall fall within the protection scope of the present disclosure.

[0045] In the description of the present disclosure, it should be understood that orientations or positional relationships indicated by the terms "center", "longitudinal", "transverse", "length" "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", "clockwise", "anticlockwise", and the like are orientations or positional relationships as shown in the drawings, and are only for the purpose of facilitating and simplifying the description of the present disclosure instead of indicating or implying that equipment or elements indicated must have particular orientations, and be constructed and operated in the particular orientations, so that these terms are not construed as limiting the present disclosure. In addition, the terms "first", "second", "third", etc. are only for the purpose of description, and may not be understood as indicating or implying the relative importance.

[0046] In the description of the present disclosure, it should be further noted that unless otherwise explicitly defined and defined, the terms "mounted", "coupled" and "connected" are to be understood broadly, and may be, for example, fixedly connected, or detachably connected, or integrally connected, or mechanically connected, or electrically connected, or directly connected, or indirectly connected through an intermediate medium. Those of ordinary skill in the art can understand the specific meanings of the above terms in the present disclosure according to specific situations.

[0047] The technical solutions of the present disclosure are specifically described below in combination with the accompanying drawings.

[0048] Embodiment 1:

[0049] The present disclosure provides a continuous ice cream processing device. The device can achieve continuous processing of an ice cream with a pleated structure.

[0050] Specifically, the device includes a conveyor line 1 and a pleat discharge nozzle 3; several trays 2 are arranged on the conveyor line 1 in sequence; the pleat discharge nozzle 3 is fixedly arranged above the conveyor line 1, and a discharge speed of the pleat discharge nozzle 3 is greater than a running speed of the conveyor line 1; and an ice cream component extruded out of the pleat discharge nozzle 3 falls onto the tray 2 under the action of the gravity and is folded in a lengthwise

direction of the tray 2 to form a pleated structure.

[0051] The discharge speed of the discharge nozzle is greater than the running speed of the conveyor line 1, so that the quickly extruded ice cream component can be automatically folded under the action of the gravity after falling onto the tray 2, thus forming the special pleated structure. The trays 2 are arranged on the conveyor line 1 in sequence, so that the special pleated structure can be continuously formed on the trays 2 along a conveying direction of the conveyor line 1 as the conveyor line 1 moves, thereby achieving quick and continuous production of ice creams with special stacked shapes.

[0052] It should be noted that an ice cream component extruded out of the above pleat discharge nozzle 3 can fall onto the tray 2 under the action of the gravity. At the same time, due to the low running speed of the conveyor line 1, the rapidly falling ice cream component can be folded up to a certain height under the influence of the gravity and then bent down to be folded. Folding up and folding down are performed alternately to finally form the aforementioned pleated structure.

[0053] The ice cream component mentioned above refer to an ice cream ingredient with a certain expansion rate and viscosity. The ice cream ingredient is of a creamy structure and can have various tastes. In this embodiment, in order to ensure that the processed pleated structure is attractive and has a fluffy texture similar to desserts such as cakes, the above ice cream ingredient needs to be pre-treated through a freezing machine.

[0054] Specifically, before expansion of the ice cream ingredient, it is necessary to ensure that an evaporator temperature of the freezing machine is approximately $-32 \pm 2^{\circ}\text{C}$, and an intake expansion rate is 60%-65%.

[0055] A conveying structure is arranged between the ice cream freezing machine and the pleat discharge nozzle 3, which can be a tubular structure, such as a hose, etc. The processed liquid can be transported to the pleat discharge nozzle 3 through the conveying structure and sprayed out through the nozzle.

[0056] A height of the obtained pleated structure and a density of pleats can be adjusted by adjusting the discharge speed of the above pleat discharge nozzle 3 and the running speed of the conveyor line 1. In a case that the discharge speed of the pleat discharge nozzle 3 is fixed, if the running speed of the conveyor line 1 is low, the pleated structure is denser. The discharge speed of the above pleat discharge nozzle 3 and the running speed of the conveyor line 1 can be adjusted according to actual needs. In this embodiment, the discharge speed of the pleat discharge nozzle 3 can be set to be 180-190 L/h; the running speed of the conveyor line 1 is set to transport 29 trays 2 per minute; and a length of each of the trays 2 is about 10-15 cm.

[0057] In addition to the discharge speed of the pleat discharge nozzle 3 and the running speed of

the conveyor line 1, the orientation of the above pleat discharge nozzle 3 can also have a certain impact on the shape of the pleated structure.

[0058] In this embodiment, a discharge direction of the pleat discharge nozzle 3 tilts towards a running direction of the conveyor line 1, and an angle between a straight line of the discharge direction of the pleat discharge nozzle 3 and a straight line of the running direction of the conveyor line 1 is less than 45°.

[0059] As an optional implementation, the angle is 30°-35°.

[0060] The specific shape of the pleated structure can be adjusted by adjusting the angle, so that the formed pleated structure is more like artificially made cream pleats, and is more lifelike visually. Of course, an actual value of the above angle can be self-set according to needs.

[0061] In addition to adjusting the height and density of the pleated structure, the device can also adjust the pleated structure by adjusting a structure of the pleat discharge nozzle 3.

[0062] In this embodiment, the pleat discharge nozzle 3 is of a flat sheet structure; and the ice cream component extruded out of the pleat discharge nozzle 3 is in a belt shape.

[0063] The specific shape of the above pleated structure is also affected by a shape of the pleat discharge nozzle 3 in addition to being affected by the running speed of the conveyor line 1 and the discharge speed of the pleat discharge nozzle 3. When the pleat discharge nozzle 3 is of the flat structure, the extruded ice cream is in the belt shape with a certain width, and the entire formed pleated structure also has a certain width.

[0064] If the width of the above pleat discharge nozzle 3 is smaller, the width of the extruded pleated structure is smaller.

[0065] In order to obtain a more changeable pleated structure, in this embodiment, at least two pleat discharge nozzles 3 can be arranged.

[0066] Specifically, when the above two pleat discharge nozzles 3 are arranged side by side, two pleated structures arranged side by side can be formed according to the number of teeth. When the above two pleat discharge nozzles 3 are arranged at the upper and lower sides, two pleated structures stacked at the upper and lower sides can be formed.

[0067] In order to ensure a smooth processing process and avoid mutual interference between pleats, in this embodiment, a plurality of pleat discharge nozzles 3 are arranged in sequence in a conveying direction of the conveyor line 1. That is, for a certain specific tray 2, there is only one pleat discharge nozzle 3 that extrudes an ice cream component towards the tray 2 and forms a pleated structure at the same time.

[0068] In order to ensure that the shapes of the pleated structures extruded out of the plurality of pleat discharge nozzles 3 remain basically consistent, as an optional implementation, the distances

between the different pleat discharge nozzles 3 and the trays 2 gradually increase in the conveying direction of the conveyor line 1, while it is ensured that the angles between the discharge directions of the different pleat discharge nozzles 3 and the conveying direction of the conveyor line 1 remain basically consistent.

[0069] It should be noted that the ice cream components extruded out of the different pleat discharge nozzles 3 can be the same or different. When the extruded ice cream components are different, a processed ice cream can form a certain visual contrast in color, or provide richer tastes.

[0070] In order to further increase the complexity of the ice cream processed by the device, as an optional implementation, an additional discharge component is also arranged above the conveyor line 1. The additional discharge component includes at least one of a tiling discharge nozzle 4, a sprinkling discharge nozzle 5, and a discharge pump 6. The tiling discharge nozzle 4 is used for extruding the ice cream component, and the extruded ice cream component can be tiled under the action of the gravity; the sprinkling discharge nozzle 5 is used for sprinkling a powder bulk material or a liquid material; and the discharge pump 6 is used for spraying the powder bulk material or the liquid material.

[0071] The additional discharge assembly can further decorate the above pleated structure in a stacking manner. Therefore, the device can use the above additional discharge component to process and make ice creams with different numbers of layers and different structures, thereby making the processed ice creams visually diverse and richer in taste.

[0072] It should be noted that the discharge speed of the tiling discharge nozzle 4 is less than the discharge of the pleat discharge nozzle 3. In this embodiment, the discharge speed of the tiling discharge nozzle 4 is approximately 165-170 L/h.

[0073] The ice cream component extruded out of the tiling discharge nozzle 4 can be the same as or different from that extruded out of the pleat discharge nozzle 3. In this embodiment, a width of the tiling discharge nozzle 4 is less than that of the pleat discharge nozzle 3.

[0074] The above sprinkling discharge nozzle 5 discharges a corresponding material under a normal pressure condition in a sprinkling manner, while the discharge pump 6 can discharge a corresponding material under a certain pressure condition in a spraying manner.

[0075] During actual processing, the sprinkling discharge nozzle 5 is generally most used for sprinkling chocolate powder or chocolate chips, while the discharge pump 6 can be used for spraying liquid chocolate. Of course, the sprinkling discharge nozzle 5 can also be used for sprinkling a little of liquid chocolate. The above-mentioned chocolate products can also be replaced with products with vanilla flavor, green tea flavor, other fruit flavors, or the like.

[0076] Generally, in order not to affect the visual significance of the pleated structure, the tiling

discharge nozzle 4 and/or the sprinkling discharge nozzle 5 are located between two adjacent pleat discharge nozzles 3. At the same time, the discharge pump 6 is arranged near a conveying tail end of the conveyor line 1.

[0077] As an optional implementation, a quantity of the tiling discharge nozzle 4 is at least two, and the tiling discharge nozzles are arranged between two adjacent sprinkling discharge nozzles 5.

[0078] As an optional implementation, a cutting unit 7 is arranged at the conveying tail end of the conveyor line 1. The cutting unit 7 can cut the ice cream formed on the tray 2 by taking the tray 2 as a unit, which facilitates subsequent processing.

[0079] During actual processing, in order to reduce the waste of materials as much as possible, the above trays 2 usually need to be arranged continuously. There is no gap between two adjacent trays 2 or only a gap that allows a related cutting structure of the cutting unit 7 to pass exists, as shown in FIG. 2.

[0080] The cutting unit 7 can achieve separation of ice creams while ensuring the continuous production of the device. At this time, the ice creams separated by the trays 2 can be transferred to subsequent processing stations through manual labor or other sets of equipment. The structure of the cutting unit 7 is the prior art and will not be further described here.

[0081] The structure of this embodiment will be explained in detail below by taking FIG. 1 and FIG. 2 as an example.

[0082] As shown in FIG. 1, the above conveyor line 1 is of a chain structure with a conveyor. When the conveyor is activated, the tray 2 located on the conveyor line 1 can be driven by a chain to move from left to right and sequentially pass through the plurality of different nozzle structures arranged on the conveyor line 1, as shown by the arrow in FIG. 2.

[0083] Specifically, an ice cream stacking and pleating station, a chocolate sprinkling station, an ice cream tiling station, a chocolate sprinkling station, an ice cream tiling station, a chocolate sprinkling station, an ice cream stacking and pleating station, a liquid chocolate spraying station, and a cutting station are arranged in sequence above the conveyor line 1. The above nozzles are arranged on the respective station in sequence, and nozzles closer to the cutting station are arranged higher.

[0084] That is, the device includes two pleat discharge nozzles 3 and two tiling discharge nozzles 4. There is one sprinkling discharge nozzle 5 arranged between the four nozzles, and the discharge pump 6 is arranged near the tail end of the conveyor line 1. The above structure can achieve sequential overlapping between ice cream layers and chocolate layers.

[0085] In this embodiment, a distance between two adjacent stations is approximately 50 cm.

[0086] It can be understood that the above device can achieve continuous processing and

production of ice creams with special stacked and pleated shapes.

[0087] Embodiment 2:

[0088] This embodiment provides an ice cream 10. The ice cream 10 is processed by the above processing device and is overall of a square structure with a certain thickness, which is provided with two pleated layers 11, at least one tiled layer 12, a sprinkled layer 13, and a decorative layer 14 in a thickness direction. The two pleated layers 11 are arranged at upper and lower sides in the thickness direction of the ice cream; the decorative layer 14 is located on upper surfaces of the pleated layers 11 and covers part of the pleated layers 11; the tiled layer 12 and the sprinkled layer 13 are arranged between the two pleated layers 11 at an interval in the thickness direction of the ice cream; and a quantity of the sprinkled layer 13 is greater than a quantity of the tiled layer 12.

[0089] Specifically, the structure of the ice cream 10 is as shown in FIG. 3 and FIG. 4. The ice cream is provided with the pleated layer 11, the sprinkled layer 13, the tiled layer 12, the sprinkled layer 13, the tiled layer 12, the sprinkled layer 13, the pleated layer 11, and the decorative layer 14 in sequence from top to bottom in the thickness direction. The pleated layers 11 and the tiled layers 12 are made by ice cream components. The sprinkled layers 13 are made by chocolate chips, chocolate powder, or other powder bulk materials. The decorative layer 14 is formed by low-temperature condensation of liquid chocolate.

[0090] At this time, the ice cream 10 has a thickness of about 3.5 cm, a length of about 10 cm, and a width of about 4 cm. A thickness of any pleated layer 11 is about 1.5 cm, and a length and width of the pleated layer 11 are the same as the length and width of the ice cream 10. A width of the tiled layer 12 formed between the two pleated layers 11 is about 3.3 cm, and a width of the decorative layer 14 located above the pleated layers 11 is about 2.5 cm. The above dimensions can be adjusted adaptively according to actual processing needs.

[0091] Of course, the pleated layers 11, the sprinkled layers 13, and the tiled layers 12 which are located at different positions can be processed using different raw materials according to processing needs, so that the processed ice cream 10 can have richer tastes and a more unique visual effect.

[0092] Embodiment 3:

[0093] This embodiment further provides a continuous ice cream processing method, including the above continuous ice cream processing device, and further including:

[0094] part of the ice cream component is extruded to the trays 2 through the pleat discharge nozzles 3, and is stacked to form a pleated structure;

[0095] part of the ice cream component is extruded to the pleated structure through the tiling discharge nozzles 4 to form a tiled structure;

[0096] the powder bulk material or the liquid material is sprinkled onto the pleated structure or the tiled structure through the sprinkling discharge nozzles 5; and

[0097] the powder bulk material or the liquid material is sprayed through the discharge pump 6 to the ice creams stacked on the trays 2.

[0098] By using the above processing method, ice creams with different structures can be made in the thickness direction of the product structure, which achieves continuous production of the ice creams with the special pleated structures.

[0099] During actual processing and production, diversified adjustment of the shape of the ice cream can be achieved by adjusting a quantity and arrangement positions of the different nozzles mentioned above. Compared with a traditional processing method, the method can achieve continuous batch processing of this type of ice cream while flexibly adjusting the shape of the ice cream with the stacked and pleated structure.

[00100] A certain processing method of the ice cream is as shown below:

[00101] An ice cream stacking and pleating station, a chocolate sprinkling station, an ice cream tiling station, a chocolate sprinkling station, an ice cream tiling station, a chocolate sprinkling station, an ice cream stacking and pleating station, a liquid chocolate spraying station, and a cutting station are arranged in sequence above the conveyor line 1. Different nozzles are arranged on the respective stations according to their functions and uses.

[00102] The trays 2 are conveyed by the conveyor 1 to pass through the above stations in sequence. In this process, ice cream layers and chocolate layers overlap each other.

[00103] It should be noted that the nozzles on the respective stations keep working, which means that in the process that the trays 2 move along the conveyor line 1, the ice creams located on the trays are always continuously processed until the ice creams are cut at the cutting station. At this time, the ice creams are formed as independent finished products by taking the trays 2 as units.

[00104] The processed ice cream finished products need to be transferred with the trays 2 to subsequent freezing tunnel equipment for freezing treatment.

[00105] The above descriptions are only specific implementation modes of the present disclosure, but the protection scope of the present disclosure is not limited to this. Any person skilled in the art can easily think of changes or replacements within the technical scope disclosed by the present disclosure. The changes or replacements should be covered by the protection scope of the present disclosure. Therefore, the protection scope of the present disclosure should be subject to the protection scope of the claims.

CLAIMS

WHAT IS CLAIMED IS:

Claim 1. A continuous ice cream processing device, comprising:
a conveyor line, wherein several trays are arranged on the conveyor line in sequence; and
a pleat discharge nozzle, fixedly arranged above the conveyor line, and a discharge speed of the pleat discharge nozzle is greater than a running speed of the conveyor line, wherein
an ice cream component extruded out of the pleat discharge nozzle falls onto the tray under the action of the gravity and is folded in a lengthwise direction of the tray to form a pleated structure.

Claim 2. The continuous ice cream processing device according to claim 1, wherein the pleat discharge nozzle is of a flat sheet structure; and the ice cream component extruded out of the pleat discharge nozzle is in a belt shape.

Claim 3. The continuous ice cream processing device according to claim 1, wherein a discharge direction of the pleat discharge nozzle tilts towards a running direction of the conveyor line, and an angle between a straight line of the discharge direction of the pleat discharge nozzle and a straight line of the running direction of the conveyor line is less than 45°.

Claim 4. The continuous ice cream processing device according to claim 1, wherein a quantity of the pleat discharge nozzle is at least two; and distances between the different pleat discharge nozzles and the trays gradually increase in a conveying direction of the conveyor line.

Claim 5. The continuous ice cream processing device according to claim 4, wherein an additional discharge assembly is further arranged above the conveyor line; the additional discharge assembly comprises at least one of a tiling discharge nozzle, a sprinkling discharge nozzle, and a discharge pump;

the tiling discharge nozzle is used for extruding the ice cream component, and the extruded ice cream component is tiled under the action of the gravity;

the sprinkling discharge nozzle is used for sprinkling a powder bulk material or a liquid material; and

the discharge pump is used for spraying the powder bulk material or the liquid material.

Claim 6. The continuous ice cream processing device according to claim 5, wherein the tiling discharge nozzle and/or the sprinkling discharge nozzle are located between two adjacent pleat discharge nozzles;

and/or, the discharge pump is arranged near a conveying tail end of the conveyor line.

Claim 7. The continuous ice cream processing device according to claim 5, wherein a quantity of the tiling discharge nozzle is at least two, and the tiling discharge nozzles are arranged between two adjacent sprinkling discharge nozzles.

Claim 8. The continuous ice cream processing device according to claim 5, wherein a cutting unit is arranged at a conveying tail end of the conveyor line; and the cutting unit cuts a material accumulated on the tray by taking the tray as a unit.

Claim 9. A continuous ice cream processing method, comprising the continuous ice cream processing device according to any one of claims 5 to 8, and further comprising:

continuously extruding part of the ice cream component to the trays through the pleat discharge nozzles, wherein the ice cream component is stacked to form a pleated structure;

continuously extruding part of the ice cream component to the pleated structure through the tiling discharge nozzles to form a tiled structure;

sprinkling the powder bulk material or the liquid material onto the pleated structure or the tiled structure through the sprinkling discharge nozzles; and

spraying the powder bulk material or the liquid material through the discharge pump to the ice creams stacked on the trays.

Claim 10. An ice cream, which is prepared by the processing device according to any one of claims 5 to 8, and comprises two pleated layers, at least one tiled layer, a sprinkled layer, and a decorative layer, wherein

the two pleated layers are arranged at upper and lower sides in a thickness direction of the ice cream; the decorative layer is located on upper surfaces of the pleated layers and covers part of the pleated layers; the tiled layer and the sprinkled layer are arranged between the two pleated layers at an interval in the thickness direction of the ice cream; and

a quantity of the sprinkled layer is greater than a quantity of the tiled layer.