



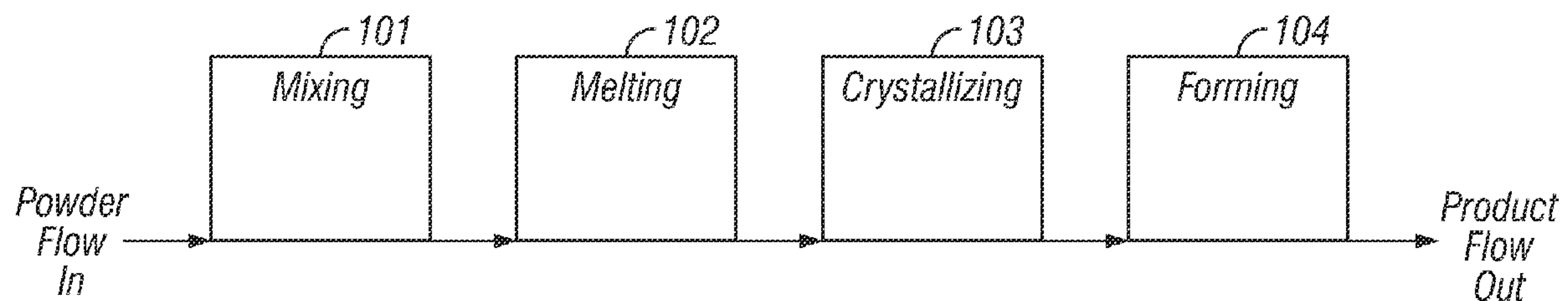
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A process for making a confection, including the steps of mixing a confection mass containing at least 80 wt. % sweetener; melting the confection mass; crystallizing the confection mass; and forming that confection mass, wherein the resulting confection contains at least 60 wt.% of the sweetener in crystal form. A confection containing at least one crystallized mass that was produced by this process.

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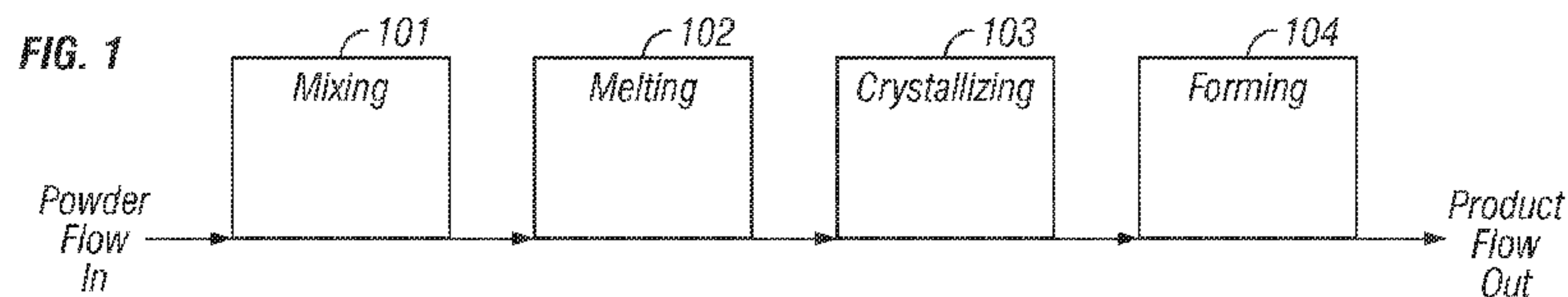
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(57) Abstract: A process for making a confection, including the steps of mixing a confection mass containing at least 80 wt. % sweetener; melting the confection mass; crystallizing the confection mass; and forming that confection mass, wherein the resulting confection contains at least 60 wt.% of the sweetener in crystal form. A confection containing at least one crystallized mass that was produced by this process.

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A METHOD OF MAKING AN EXTRUDED BRITTLE CONFECTIONARY

FIELD OF THE INVENTION

[0001] The present invention relates to a process for making confectionary products that comprise a brittle confection layer, and the confectionary products produced by that process.

BACKGROUND OF THE INVENTION

[0002] Consumers have indulged in different forms of confections for hundreds of years. Confection production has changed over time to meet the interests, desires and needs of consumers, as well as the practical requirements of the confection manufacturers. Confections may be formed having various textures or layers, such as soft, chewy, hard, brittle, etc., all of which are provided to meet the liking of the consumers. For example, some consumers like hard and brittle confections on their own, or in combination with other confection textures. When a hard confection that is brittle is combined with a soft confection, the brittle confection is perceived as even more brittle than when it was alone. A consumer's mouth notes the comparative textures as the multiple layer confection is chewed. A brittle confection may be characterized as being crunchy when chewed. The consumer can feel and hear the sound of the confection breaking-up into small pieces as it is chewed, that is, they can hear and feel a "crunch" during chewing. When chewed, a brittle confection tends to not just break cleanly into two pieces when teeth pass through it, but instead, the confection tends to shatter into many small pieces. The more brittle the confection, the smaller the resulting broken pieces. Consumers like confections that have a fast release of ingredients, often described as a burst of sweetness and/or flavor. The smaller the broken confection pieces and the greater the number of small confection pieces, such as with a brittle confection, the more quickly the pieces dissolve in saliva, resulting in a perceived fast delivery of the ingredients.

[0003] In general, consumers like variety within their confections. Confections with multiple textures lead to multiple physical sensations perceived by the consumer. A confection with multiple textures may further include multiple ingredient release characteristics, which result in varied delivery of sweetness, flavor, actives and sensates. As used herein, sensates are ingredients that create a physical response, including but not limited to, tingling, numbing, warming, cooling, and combinations thereof. A soft confection, such as a chewing gum or other chewy confection, gives a contrast in texture with the brittle confection. The chewy confection also gives a slower release of ingredients than a brittle confection. Chewing gum and other soft and chewy confections are generally elastic and deform during chewing, but do not break or crack. Sweeteners and other water soluble ingredients (such as flavor and sensates) are slowly released from the chewy confection as saliva mixes with the chewy confection mass during chewing and dissolves the ingredients.

[0004] An example of a traditional product that has multiple textures and multiple speeds of release of ingredients is Eclipse ® chewing gum. In general, Eclipse ® chewing gum is in a pellet form having a chewing gum center and a hard confection outer layer. The outer confection layer is hard, and can also be brittle. As a result the brittle confection breaks up and dissolves during chewing thereby releasing ingredients faster than the softer center chewing gum confection layer. Such released ingredients include, but are not limited to, flavors, actives, and sensates. Often these confections also include high intensity sweeteners (HIS) to increase the sweetness of the confection.

[0005] The hard confection layer of Eclipse ® chewing gum is comprised of an array of crystals containing sweetener in crystalline form. Additional ingredients are further included in or between the sweetener crystals. In general, the brittleness of a hard confection layer is the result of the array of sweetener crystals having numerous points of weakness between neighboring crystals. The array of sweetener crystals is such that when force is applied by teeth to the confection layer during chewing, fractures are created between crystals. The fractures cause the confection layer to be brittle and so to shatter into many small pieces, thus creating an audible and tactile crunchiness sensation.

[0006] Currently, the most popular means of making the brittle confection layer around chewing gum is by pan coating. Traditional chewing gums contain 30 - 32 wt. % hard confection outer layer and 68 - 70 wt. % chewing gum center layer. With pan coating the confection comprising an array of crystals is produced by a multi-step process. In general, the pan coating process involves multiple spray applications of supersaturated confection solution, or molten confection mass containing sweetener, on to the confection center layer pieces that are tumbling in a coating pan (i.e., Driam™, or other tumbling apparatus) with drying pauses between spray applications during which the spray applied material crystallizes. Applications of confection solution or molten mass continue to be applied to the confection center layer until the preferred amount of outer confection material is applied.

[0007] Although, the pan coating process can create an outer confection coating that has a brittle texture, there are several challenges with pan coating processing. One challenge is the required processing time to create a hard texture that is also brittle. A confection pan coating on a chewy center could require 10 – 100 fluid spray applications, with tumbling and drying between each. For crystal formation to occur, time must be allowed to evaporate the liquid in each spray application and to grow the crystals from the supersaturated or molten sweetener spray. The higher the crystal content, the more brittle the confection layer. Also, with all spray applications, care must be taken to keep application volume small or a later application can dissolve or melt crystals formed from an earlier application. Attempts have been made to speed up the pan coating process, with limited success.

[0008] One example of a method used to shorten pan processing time is spraying a more heavily concentrated sweetener solution onto the chewy confection center layers. This method requires greater drying time and/or application of hot blowing air between spray applications to allow the applied material to crystallize. This tends to cause uneven and/or large crystal growth with noncrystallized hardened mass between the crystals, all of which reduces the layer's crunchiness, ultimately resulting in a reduction in the perceived crunchiness of the product.

[0009] A second example of a method used to shorten pan processing time is to apply an amount of crystalline sweetener material (also called dry charge) to the wet surface of the confection after the spray application. Some of the added dry charge material acts as nucleating agent, and some dry charge material increase the concentration of the applied supersaturated solution. Both of these encourage crystallization of the applied solution. This may also result in uncontrolled crystal growth, which may cause large crystals to form resulting in increased layer hardness, but decreased layer brittleness, and ultimately decreased crunchiness.

[0010] A third example of a method to shorten pan processing time is by using molten sweeteners as the mass sprayed onto chewy confection layers. This technique does reduce the pan coating process time because less time is needed to evaporate the water contained in an applied supersaturated solution. The use of molten sweeteners still requires many spray applications, along with time between each spray addition to allow cooling and crystallization of the applied mass. Also, care must be taken that later applied layers do not re-melt the earlier layers. Molten sweeteners also require additional equipment such as heated fluid transfer lines and spray application nozzles to prevent clogging.

[0011] A second challenge of the pan coating process, in addition to the long processing time, is controlling the crystallization of the sweetener itself. As described above, methods used to attempt to speed up pan processing may affect crystal growth. Slow crystal growth during application of the confection layer may create large crystals. Large crystal formation creates a gritty coating texture, either as a surface texture or when broken into smaller pieces. Smaller crystals may create a smoother, less gritty, texture, but smoother textures will require more nucleation sites such as from dry charge sweetener powder added during fluid spray application, or by very slow application of multiple spray and dry cycles.

[0012] The type of sweetener chosen also affects the speed and amount of crystal growth. Some sweeteners (e.g., sorbitol) are stable in their supersaturated or molten state and may need additional ingredients to initiate or continue crystal formation. With these sweeteners, some powdered sweetener may be added to the supersaturated or molten sweetener mass. Other sweeteners (e.g., erythritol)

are not stable in their supersaturated or molten state and may need additional ingredients to inhibit (that is, slow or limit) their crystal formation.

[0013] Crystallization of sweetener molecules may be inhibited by ingredients included in the supersaturated confection solution or molten confection mass used in making the confection layers. These inhibitor ingredients often result in a less brittle layer. These inhibitor ingredients include, but are not limited to fiber, starch, dextrin, gum arabic, inulin, hydrogenated starch hydrolysate, corn syrup, polyol syrups, other sweeteners, calcium carbonate, talc, and combinations thereof. These inhibiting ingredients may be added to the applied solution or molten mass in order to, but not limited to, speed up the crystallization process, reduce coating cracking, add flavor and/or sweetness, and to reduce the overall amount of sweetener in the coating. These inhibiting ingredients interfere with sweetener growth by blocking contact between sweetener crystals and/or by gluing sweetener crystals together, thus creating fewer weakness, or fracture, points between crystals that are necessary to have a brittle confection layer. Accordingly, it is the addition, or incorporation of these ingredients within a confection that fail to provide a brittle confection layer, or result in a non-brittle confection layer.

[0014] A third challenge of pan coating includes limitations on the center confection layer formula and format. In order to endure the elevated temperatures of pan coating, only certain center confection layer formulas can be used for making centers with the pan coating process. Center confection layer pieces need to maintain a firm shape, not break, not melt, and not become sticky during application of the outer confection layer. Center confection layer formulas cannot contain ingredients that would interfere with the hardening and crystallization of the applied supersaturated or molten outer layer confection mass.

[0015] A fourth challenge of pan coating includes the limits on the final form of the final confection product that contains a brittle confection mass. With the pan coating process, the formation of a brittle confection mass requires a second confection layer (that is, a "center" confection mass, layer, or piece), since the brittle confection mass is created by building a brittle mass around this center piece. The pan coating process includes tumbling the confection centers. This tumbling motion occurs when the confection center layer pieces are moved around

in an approximately circular movement in a rotating pan or cylinder while being sprayed with hot supersaturated sweetener solution or molten sweetener mass. The tumbling process rounds, or smoothes, edges and corners of the center confection pieces as the outer confection mass is applied around roughly the entire outer surface of the center confection mass. The tumbling is a necessary part of the pan coating process as it creates the friction required to create sweetener crystal growth.

[0016] A different process for making a multiple layer confection, which has multiple textures and multiple ingredient release, is through making a hard, amorphous (i.e., glass) confection mass layer around an additional confection center mass layer by dipping or molding. An example of a multilayer confection made by this type of process is a Tootsie Pop ® lollipop confection. The hard amorphous confection layer has sweetener ingredients in an amorphous form with other ingredients trapped within the amorphous form. These other ingredients include, but are not limited to, flavors, colors, actives, HIS, and sensates. If the Tootsie Pop ® lollipop is chewed, the consumer will perceive a two stage delivery of textures and ingredient release. One delivery stage is when the outer hard amorphous confection layer breaks as teeth are forced through it and the resulting pieces are slowly dissolved. A second delivery stage is when the center soft chewing gum layer is chewed and saliva washes ingredients from the gum mass. Though the outer layer breaks as it is chewed, the flavors, sensates and other additional ingredients are still trapped in the amorphous confection and the confection needs to dissolve to release the ingredients. There is no fast release of ingredients from an amorphous confection layer of this type.

[0017] The process of making these multilayer confection products, which contain a hard amorphous confection layer around an additional center confection layer, is by dipping or molding. The amorphous confection layer may be hard, but not brittle, and so not crunchy, unless the amorphous layer contains enough of the sweetener in crystal form to create enough weak points in the confection layer to cause fracturing when chewed. The more crystalline the confection, the more brittle the confection, and so the more crunchy the confection.

[0018] The dipping and molding methods are traditionally used to create a smooth, clear, hard amorphous outer layer around a center, which is usually a soft and/or chewy confection layer, such as chewing gum. During the dipping process a confection layer is immersed in a fluid mass that contains a supersaturated confection solution or a molten confection mass that contains sweeteners. The act of immersion may be done once or several times until the desired thickness of confection material is accumulated on the center. Drying and/or cooling steps may be alternately integrated with each immersion step. The type of sweetener chosen may also affect the dipping process as the properties of the sweetener affect how fast it will crystallize. As previously discussed, some sweeteners (e.g., sorbitol) are stable in their supersaturated or molten form and will need additional ingredients to initiate and encourage crystal growth. Other sweeteners (e.g., erythritol) are not stable in their supersaturated or molten form and will need additional ingredients to inhibit, and control, crystal growth. So, the dipping process for making a hard confection layer that is brittle is very time consuming and difficult to control.

[0019] The molding process comprises depositing (or pouring) a supersaturated solution or a molten confection mass into a mold containing a center confection layer, for example, a soft and/or chewy confection mass. To create crystal formation, the molding method may need drying and/or cooling between multiple supersaturated solution or molten mass deposits to the mold. The center confection mass could be formulated to encourage crystal growth. As previously discussed, the choice of sweetener could affect the additional ingredients that may be added to the confection mass, to initiate and/or control crystal growth.

[0020] The dipping and molding processes have challenges as to the final format of the final multilayer product made. One limitation of the dipping and/or the molding process is that the hard amorphous confection layer creates a continuous layer around a center layer. Also, though the molding process traditionally creates an amorphous confection layer around a center layer, an amorphous confection mass could be made without a center layer. That is, the amorphous confection mass could be deposited, or poured, into an empty mold. But, the dipping process requires a center confection layer upon which the amorphous confection material

adheres to and builds on during dipping. The shape of the center confection layer will be roughly duplicated as the amorphous confection mass builds upon it, though corners and edges will be rounded

[0021] The dipping and molding processes also have challenges as to confection center formulas. The center confection formula must be able to handle the heat of processing and not interfere with the crystallization of the outer confection mass.

[0022] Although consumers like variety in their confectionary product choices, many consumers like some indication of what they will be consuming before they put it in their mouth. As already discussed, pan coating, dipping, and molding processes create an outer confection layer that completely surrounds the center confection layer. With these processes consumer only see the color and texture of the outer layer. Therefore, it would be useful to have a process that could deliver a confection mass, or layer, that would be hard and brittle, with a consumer acceptable crunchy texture. Additionally, it would be useful to have a process that could control sweetener crystal formation such that the final confection product has a consumer acceptable crunchy texture. Additionally, it would be useful to have a process where the amount of crystal growth may be controlled such that the confection mass is fluid and flexible from crystallization through packaging and yet be crunchy when a consumer chews the final product.

SUMMARY OF THE INVENTION

[0023] The invention relates to a process for creating a confection, including the steps of mixing a confection mass containing at least 80 wt. % sweetener; melting the confection mass; crystallizing the confection mass; and forming the confection mass, wherein at least 60 wt. % of the sweetener is in crystal form. The invention further includes a confection containing at least one crystallized mass that was produced by this process.

BRIEF DESCRIPTION OF THE FIGURES

[0024] Figure 1 is a process flow diagram for making a confection product in accordance with an embodiment of the present invention.

[0025] Figure 2 is a block flow diagram for making a confection product by a process in accordance with another embodiment of the present invention.

[0026] Figure 3 is a block flow diagram for making a confection product by a process in accordance with another embodiment of the present invention.

[0027] Figure 4 is a process flow diagram for making a multi-layered confection product in accordance with another embodiment of the present invention.

[0028] Figure 5 is a perspective view of a confection product in accordance with an embodiment of the present invention.

[0029] Figure 6 is a perspective view of a confection product in accordance with another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0030] The present invention relates to a process for creating a crystallized confection product. In particular, the invention relates to a process for creating a hard and brittle crystallized product containing at least 80 wt. % sweetener, wherein at least 60 wt. % of the sweetener is in crystal form. The present invention also relates to the crystallized confection product made with this process.

[0031] The present invention further relates to a process for creating a multilayer confection product comprising at least a hard and brittle, preferably crunchy, crystallized confection layer and an additional confection layer. Preferably the additional layer is a chewy confection. More specifically, the present invention further relates to a process for forming a multilayer confection product, including the steps of creating at least one hard and brittle confection layer containing at least 80 wt. % sweetener, wherein at least 60 wt. % of the sweetener is in crystal form formed by a crystallization process; creating an additional confection layer; and combining the layers into a multilayer confection product. Moreover, the process may further include the step of finishing the combined layers by a variety of methods including, but not limited to, pressing, scoring, cutting, embossing, debossing, spraying with liquid, and dusting with

particulates or powders. The present invention further relates to products made with this process.

[0032] An embodiment of the present invention relates to a process for controlling the crystallization of a sweetener as a confection mass is produced. In accordance with an embodiment of the invention, the sweetener content of a confection mass is at least partially crystallized early in the production process and then completes crystallization by the time the consumer chews the final packaged product at room temperature (i.e., 20 - 27 C). During processing the amount of sweetener in crystal form is controlled in such a way that the confection mass remains fluid and flexible until the product reaches room temperature, at which time the finished product is hard and brittle. The confection mass contains at least 80 wt. % sweetener, wherein at least 60 wt. % of the sweetener is in crystal form after the confection mass completes crystallization and reaches room temperature.

[0033] In accordance with an embodiment of the present invention, the sweetener ingredients may include, but are not limited to, sucrose, dextrose, maltose, isomaltulose, polydextrose, galactose, trehalose, tagatose, sorbitol, maltitol, isomalt, erythritol, xylitol, mannitol, or combinations thereof. Preferably the sweeteners of the embodiments of the present invention are isomalt, sorbitol, maltitol, xylitol, erythritol, or combinations thereof. Most preferably, the sweetener is isomalt or sorbitol. The confection mass can also include additional ingredients, such as, but not limited to, flavors, high intensity sweeteners (HIS), sensates, actives, and colors. In one embodiment, the crystallized confection includes only a sweetener and additional ingredients selected from the group consisting of sweeteners, colors, flavors, actives, sensates and combinations thereof. Preferably, the sweetener is isomalt, sorbitol, maltitol, xylitol, erythritol or combinations thereof.

[0034] As previously discussed, a hard confection is described as having a brittle texture if the hard confection breaks (i.e., shatters) into many small pieces when it is bitten into. The more brittle the confection, that is, the more it breaks into small pieces, the more likely it will be perceived as crunchy by the consumer during chewing because they will hear and feel more confection breakage. In general the term "brittle" is characterized as the fracturing of the confection piece

along points of weakness between sweetener crystals during chewing. Additional ingredients in a confection formula can impact and actually limit the number of weak points in a confection mass. The additional ingredients can act as "glue" to hold sweetener crystals to each other. These additional materials may include supersaturated sweetener solution, molten sweetener, fiber, starch, dextrin, hydrocolloids, gum arabic, inulin, and combinations thereof. In an embodiment of this invention, the confection mass contains little or no such additional ingredients, and so the confection mass formula may be used in creating a hard confection that is brittle.

[0035] The process for making such a crystallized confection that is hard and brittle, may be accomplished in accordance with an embodiment of the present process invention that includes the steps of: 1) mixing a confection mass containing at least 80 wt.% sweetener; 2) melting the confection mass; 3) crystallizing the confection mass, such that at least 60 wt.% of the sweetener in the confection mass is in crystal form; and 4) forming the confection mass into a ribbon, sheet, or rope and then into individual pieces. A conditioning step may be added between the crystallizing step and the forming step, where the conditioning step prepares the crystallized mass to flow through the remaining process steps in a controlled and even flow.

[0036] As previously suggested, in accordance with an embodiment of this invention, the process includes the step of mixing confection ingredients together to create a homogeneous confection mass. Preferably, the confection ingredients are mixed together to form a confection mass of even density without lumps. In one embodiment, the confection ingredients and the resulting mixed confection mass are in powder form. Preferably, the powdered confection mass contains approximately less than 10 wt. % water. The presence of water in the confection mass during processing increases the possibility of the formation of supersaturated solution that may become trapped between crystals during crystallization, resulting in a less brittle finished product. The powdered confection mass may include sweeteners, singularly or in combination as discussed above, as well as additional ingredients known in the confection industry. The resulting confection mass of embodiments of this invention contains at least 80 wt. % sweetener.

[0037] In accordance with an embodiment of the invention, the process further includes the step of melting the confection mass. In accordance with one embodiment, the powdered confection mass may be melted through the application of shear. The term “shear” is herein defined to include the application of energy to the confection mass, such as through mixing the ingredients using a rotating plate, pin or screw configuration. Additional heat may be applied to the confection mass during the melting process step. Preferably, all of the sweeteners in the confection mass are melted to form a uniform mass before the mass flows to the next step of the process.

[0038] In accordance with an embodiment of the invention, the process further includes the step of crystallizing at least a portion of the melted confection mass. In one embodiment, the melted confection mass may be mixed and cooled in such a way that at least 60 wt. % of the sweetener in the confection mass converts into its crystal form. In accordance with an embodiment of the invention enough shear is applied through mixing to transform at least some of the melted sweetener in the confection mass into its crystal form. To encourage crystal growth, the confection mass may be cooled during this process step by any means known to those skilled in the art.

[0039] In an embodiment of this invention, the process further includes the step of forming the partially crystallized confection mass into a shape. The confection mass may be formed by forcing the confection mass through an opening, that may or may not include a shaping member having a slit or hole in it. In accordance with a preferred embodiment, when the preferred amount of crystal content is reached in the crystallization step and/or conditioning step (as discussed in more detail below), the confection mass is forced through an opening having a shaping member. The opening and/or shaping member may be designed to form the mass into a desired product form, including for example, but not limited to, a ribbon, sheet, or rope shape. Moreover, the movement of the confection mass through the opening and/or shaping member may result in more shear (i.e., energy) being applied to the confection mass, thus resulting in the conversion of more amorphous sweetener material into its crystal form. Accordingly, the confection mass of one embodiment contains at least 90 wt. % sweetener, wherein at least 70

wt. % of the sweetener is in crystal form when the confection mass is at room temperature. As previously suggested, most preferably the amount of crystal content in the confection is such that it will be hard and brittle at room temperature.

[0040] In another embodiment of the invention, the process may further include the step of conditioning the confection mass after the crystallization step and before the forming step. This processing step prepares the confection mass for exiting the shaping member in a consistent, even flow. The conditioning process step may additionally include further heating of the partially crystallized confection mass above the temperature of the mass during the crystallization process. The conditioning step may further optimize temperature and mixing conditions resulting in a more uniform crystal size, such as by, for example, through melting large crystals and growing small crystals.

[0041] In another embodiment of the invention, the process may further include the step of finishing the confection mass after the forming step. Accordingly, the product formed (e.g., a ribbon, rope or sheet) may be further processed in a finishing step. The finishing step may include, but is not limited to, pressing, scoring, cutting, embossing, debossing, spraying with liquid, dusting with particulates or powders, or combinations thereof, the product form. In a further embodiment of this invention, the confection mass can be formed into individual confection pieces before or after the finishing step. This final piece forming can be accomplished by any method known to those in the art, including, but not limited to, drop roller, Uniplast, rotary cutter, or knife wheels.

[0042] In accordance with embodiments of the present invention, the process steps for creating a crystallized confection mass, as discussed above, may be achieved through a batch, a continuous process, or a semi-batch process (that is, a combination of process elements of both the batch and continuous processes).

[0043] In one embodiment of the present invention, a batch process may be used wherein a batch of ingredients, that is, a set weight of ingredients, may be mixed, melted, and crystallized into a confection mass. The confection mass is then passed through some means of forming (e.g., a die plate having a slit or hole) such that the partially crystallized confection mass is formed into, for example, a ribbon, sheet, or rope-like shape or other product form. The batch process may be

accomplished through the use of various methods, such as for example, a kettle with a water jacket and a mixing member, such as, but not limited to a spindle or blade. Moreover, the forming of the confection mass into a shape (e.g., ribbon, sheet, or rope) may be accomplished by allowing the fluid confection mass to travel out of the bottom of the kettle, through a pipe, and optionally through a die plate with a slit or hole.

[0044] Preferably, the steps used to create a crystallized confection mass may also be accomplished through the use of a continuous process. In a continuous process, the confection mass flows (i.e., moves) in one direction through a processing apparatus, such as an extruder. One particular advantage of using a continuous process is controllability. In particular, continuous processing ensures that controllable processing conditions are applied to all of the material within the process. Preferably, this continuous process would be accomplished through the use of an apparatus having sections, or areas, designed for mixing, melting, and crystallizing a confection mass, as well as, an opening with or without a shaping member having a slit or hole for forming the confection. Preferably, the apparatus is designed so as to have continuous forward flow and adjustable application of shear. Preferably, the apparatus is designed so as to have adjustable application of heat or cooling. According to one embodiment of the invention, the adjustable application of shear applied to the confection mass in the apparatus may be provided independently in various sections of the apparatus. The application of shear may be applied, for example, through the integration of a screw configuration that contains at least one screw running longitudinally through the apparatus (as will be discussed in more detail below). One way of adjusting the application of shear is through the use of screw elements that may be arranged to give high shear during melting of the confection mass and low shear during the crystallizing step. For example, as discussed in more detail below, in a preferred embodiment, a twin screw, intermeshing, co-rotating screw arrangement runs longitudinally through an apparatus from ingredient addition port through the mixing, melting and crystallization sections of the apparatus.

[0045] As originally set forth above, Figure 1 further illustrates a flow diagram of an embodiment of the present invention using a continuous process including the steps of: 1) mixing (101) a confection mass containing at least 80 wt. % sweetener; 2) melting (102) the confection mass; 3) crystallizing (103) the confection mass, wherein at least 60 wt.% of the sweetener in the confection mass is in crystal form; and 4) forming (104) the confection mass.

[0046] In accordance with the process as shown in Figure 1, Figure 2 further illustrates a block diagram of an apparatus that may be used in connection with the process described. As shown, the apparatus may be divided into multiple sections and/or portions for performing the various steps of the process. In an embodiment, Figure 2 provides an apparatus, wherein: 1) the confection mass is added through an entrance port (201); 2) the confection mass is mixed in a first section (202); 3) the confection mass is melted in a second section (203); 4) the confection mass is crystallized in a third section (204); and 5) the confection mass is formed into a product form (such as a rope, ribbon or sheet) through a shaping member (205). The confection mass may additionally be cut into individual pieces. In general, a screw configuration (206) may be used within the apparatus to convey the confection mass from the entrance port to the forming section

[0047] In accordance with an embodiment of this invention, a hard and brittle confection mass is produced by a continuous process through the use of an apparatus with sections, such as an extruder. An entrance port opens into a first section of the apparatus. In this first section, a confection mass (containing less than 10 wt. % water, preferably less than 2 wt. % water) is mixed at a temperature below sweetener melting temperature, preferably at approximately 20°C – 40°C, more preferably at 20°C – 27°C. Moreover, the confection mass is mixed until the mass is homogeneous, preferably removing any ingredient lumps.

[0048] The confection mass may be conveyed (i.e., moved) by the screw configuration to another section of the apparatus for the melting process step. In this second section of the apparatus, the confection mass is mixed and melted at a temperature chosen so as to melt the sweetener in the confection mass, preferably at approximately 40°C – 190°C, more preferably at 60°C – 180°C. The temperature is dependent on the melting point of the sweetener in pure crystal

form. The amount of heat applied to the confection mass is dependent on both the melting point of the sweetener in pure crystal form and the amount of heat created by shear created in processing.

[0049] Once the mixed mass is melted, the melted mass may then be conveyed by the screw configuration to another section of the apparatus for the crystallization step. In this third section of the apparatus, the confection mass is mixed and cooled at a temperature such that the sweetener will at least partially crystallize, preferably at approximately 50°C – 180°C, more preferably at 60°C – 180°C, and under pressure of approximately 300 – 1000 psi. The pressure in this section may be created by the increased viscosity of the confection mass as at least part of the sweetener in the mass crystallizes. The pressure may also be created by screw elements configured to move mass forward and then backwards in this section. The pressure in this section may also be created by the mass being conveyed forward against the exit opening of the extruder, especially if the opening has a smaller diameter than that of the extruder barrel. The pressure in this section may be created by the mass being conveyed forward against a shape member at the exit opening of the extruder. Thus, the crystallizing conditions are dependent on the melting point of the sweetener and the crystallizing conditions need to be such that the final formed confection mass, having at least 80 wt. % sweetener, will have at least 60 wt. % of the sweetener in its crystal form.

[0050] As previously described with reference to Figures 1 and 2 an extruder may be used having sections for mixing, melting, crystallizing, and conditioning the confection mass. These sections of the extruder may contain sub-sections (also called "barrels") in order to maintain the optimal conditions for mixing, melting, crystallizing, and conditioning the confection mass. These sub-sections may have temperatures different from their fellow sub-sections, but all sub-sections may have temperatures within the section temperature ranges already discussed.

[0051] As further shown in Figure 2, the shape member (205) may be a die plate added to the opening of the extruder. The die plate contains an opening that forms (i.e., shapes) the extruding confection mass as it leaves the extruder. The die plate may contain a slit or hole that will form the confection mass, wherein the product form may be a ribbon, sheet, or rope-like shape. The rope-like shape

need not be cylindrical, but may be any geometric shape (i.e., square) or silhouette (i.e., clover leaf or animal outline). The ribbon or sheet-like shape need not be smooth or flat, but may have ridges.. The die plate, because of its limited aperture, creates an obstruction against which the screw configuration pushes the confection mass, creating more potential crystal growth than without a die plate. This creates additional shear that can aid in creating consistent, even flow of crystallized confection mass from the extruder. The die plate edges also may create additional shear on the confection mass, aiding in the crystallization of the sweetener mass as the mass flows out of the extruder.

[0052] When the crystallized confection mass exits the extruder through the die plate, a crystallized confection ribbon, sheet, or rope is formed. The confection mass of the ribbon, sheet, or rope contains at least 80 wt. % sweetener, wherein at least 60 wt. % of the sweetener in the crystallized mass is in crystal form.

[0053] Figure 3 further illustrates a block diagram of an apparatus for use in an embodiment of the present invention, wherein: 1) the confection mass is added through an entrance port (301); 2) the confection mass is mixed in a first section (302); 3) the confection mass is melted in a second section (303); 4) the confection mass is crystallized in a third section (304); 5) the confection mass is conditioned in a fourth section (305); and 6) the confection mass is formed into a rope, ribbon or sheet through a shaping member (306). The confection mass may additionally be cut into individual pieces. In general, a screw configuration (307) may be used within the apparatus to convey the confection mass from the entrance port to the forming section.

[0054] The conditioning process step can be completed in a section within the extruder or in an apparatus separate from the extruder, for example, in a die head apparatus. This fourth section or die head apparatus would be capable of mixing, cooling, and/or heating the crystallized confection mass before the mass exits the die plate. The crystallized confection mass may be conditioned in order to prepare the confection mass to exit the extruder through a die, or die head apparatus. This conditioning step may contain further heating of the confection mass at a temperature dependant on the sweetener melting point, preferably at approximately 80°C – 200°C, under a pressure preferably at a pressure of 300 –

1000 psi. Conveying the confection mass from the extruder ingredient addition port to the die plate and/or to the die head apparatus with die plate, may be done by a screw configuration.

[0055] As previously described with Figure 2, sections of the extruder may contain sub-sections in order to maintain the optimal conditions for mixing, melting, crystallizing, and conditioning the confection mass. The die head apparatus may also have sub-sections. These sub-sections may have temperatures different from their fellow sub-sections, but all sub-sections may have temperatures within the section temperature ranges already discussed.

[0056] In accordance with further aspects of this invention, the confection mass ribbon, sheet, or rope may be heated to control confection mass crystal content, product flexibility, and product viscosity. The confection mass preferably stays fluid and flexible throughout the forming step to avoid unwanted breakage or cracking. In order to keep the confection ribbon, sheet, or rope at the desired temperature for forming and/or finishing, the confection mass temperature (after exiting the die plate and/or die head apparatus) may be controlled by a number of methods, including but not limited to, performing the forming and/or finishing process in a temperature controlled compartment; conveying the confection mass on heated conveyor belts, plates, or platforms; irradiating the confection mass with infrared lamps, or blowing hot air onto the confection mass.

[0057] A finishing process step may further include, as part of the process, rollers or wheels that may press the confection mass. The pressing process may be done to press a pattern into the confection mass (e.g., embosses), or otherwise mark the confection mass. The rollers or wheels may be heated or cooled. In order to stabilize the pressed pattern or mark, the confection surface may be further chilled after pressing. The finishing process step may also include spraying the confection layer surface with a liquid, optionally containing additional dry (i.e., solid) material. The material sprayed may include, but is not limited to, colored or uncolored liquids comprising syrups, molten sweeteners, molten waxes, molten fat, oil, sweeteners, high intensity sweeteners (HIS), colors, actives, flavors, sensates and combinations thereof. Moreover, the finishing process step may further include dusting the confection layer surface with a particulate or powder. The

material dusted may include, but is not limited to, colored or uncolored particulates or powders comprising waxes, fat, oil, sweeteners, high intensity sweeteners, colors, flavors, actives, sensates and combinations thereof. The particulates may include beads, nut pieces, or fruit pieces.

[0058] In accordance with another embodiment, the present invention further relates to a process of the invention for forming a multilayer confection product, wherein at least one of the layers is a hard and brittle, confection layer. This process for making a multilayer confection includes the steps of creating a brittle confection layer containing at least 80 wt. % sweetener, with at least 60 wt. % of the sweetener in crystal form; creating an additional confection layer, including, but not limited to, a chewy confection; combining the layers; and finishing them by such methods as described above, including, but not limited to, pressing, scoring, cutting, embossing, debossing, spraying with liquid, dusting with particulates or powder, or combinations thereof.

[0059] The additional confection layer in a multilayer confection product may be produced by any process known to those skilled in the confection arts, such as, though not limited to, the use of an extruder, a heated mixing kettle, or other various methods for making confections. The additional confection layer may be, but is not limited to, chewing gum, toffee, caramel, fudge, chocolate, nougat, licorice, fondant, gummy, jelly, or combination thereof. Moreover, the additional confection layer may contain, but is not limited to, colors, sweeteners, flavors, sensates, actives, fat, cocoa based ingredients, milk based ingredients, fruit based ingredients, proteins, hydrocolloids, fiber, starch, pectin, gelatin, gum base, emulsifiers, or combinations thereof. The sweetener ingredients can be, but are not limited to, sucrose, dextrose, maltose, isomaltulose, polydextrose, galactose, trehalose, tagatose, sorbitol, maltitol, isomalt, erythritol, xylitol, mannitol, or combinations thereof.

[0060] Moreover, the multilayer confection created by combining a brittle layer and an additional confection layer may be further formed into individual confection pieces before or after finishing the multilayer confection by any method known to those in the art, including, but not limited to, drop roller, Uniplast, rotary cutter, or knife wheels.

[0061] In order to keep the combined layered confection at a desired temperature for forming and/or finishing, that is flexible, the combined layered confection mass temperature may be controlled by a number of methods, including but not limited to, performing the forming and/or finishing process in a temperature controlled compartment; conveying confection mass on heated conveyor belts; irradiating the confection mass with infrared lamps, or blowing hot air onto the confection mass.

[0062] Figure 4 illustrates a flow diagram of a method of making a multilayer confection having a brittle crystalline layer and an additional confection layer. This process includes the steps of: 1) creating (401) at least one hard and brittle confection layer; 2) creating (402) an additional confection layer; 3) combining (403) at least one hard and brittle confection layer and an additional confection layer; 4) finishing (404) the multilayer confection; and 5) forming (405) the multilayer confection into individual pieces. The finishing and forming process steps may be performed by methods and apparatus previously described. The multilayer confection may include additional materials between the confection layers, including, but not limited to, liquid ingredients sprayed or dry ingredients dusted onto individual layers before layers are combined.

[0063] As previously described it is desirable to maintain processing conditions, such that, the crystalline confection layer and the additional confection layer remain fluid and flexible until after the layers are combined. This will reduce layer breakage and also allow better adhesion of the layers to each other during combining (i.e., assembly) of the layers. Various methods of maintaining layer temperature may be used as previously described, such as, using a temperature controlled container or applying heat through various means. Temperature control during combining and further processing of the layers is also important to ensure that the crystalline confection layer does not melt or deform the additional confection layer.

[0064] A challenge with combining a partially crystallized confection layer with an additional confection layer, such as chewing gum, is that the layers may possibly damage each other upon contact unless a further process step, layer tempering, is completed before combining the layers. The crystalline confection

layer is most likely around or over 100 C when it exits the extruder and die plate. That temperature is greater than the melting point of the sweetener in the additional confection layer. Also, if the additional confection layer is chewing gum, 100 C is higher than the softening temperature of chewing gum base. Hence, the crystalline confection layer will most likely deform or otherwise damage the additional confection layer if the layers are combined immediately upon being formed. If the crystalline confection layer is cooled to the point where it will not melt, soften, or otherwise damage the additional confection layer, the crystalline confection may become too brittle and may break during combining of layers and during any further processing (e.g., finishing).

[0065] In an embodiment of this invention, a further process step includes a layer tempering process step, wherein the layers are individually handled in such a way that their temperature profiles may be adjusted post extrusion and before combining. In one embodiment of this invention, this layer tempering process is completed using a plate or platform, on which a hotter confection layer (e.g., crystalline layer) can rest before that layer moves on to touch a cooler confection layer (e.g., chewing gum layer). The plate contains a method of adjusting the temperature profile of the hotter confection layer without making the layer too brittle for further processing. Once the confection layers are tempered, they are combined into a multilayer confection that may be further finished and/or formed.

Figures 5 and 6 illustrate embodiments of a multilayer confection product of the present invention. In particular, Figure 5 illustrates a multilayer confection product of the present invention containing three layers in a sandwich format, for example, two outer brittle crystallized confection layers and a center additional confection layer. Figure 6 illustrates a multilayer confection product of the present invention containing two layers in a laminated format, for example, one brittle crystallized confection layer and one additional confection layer. Alternate configurations of the product are considered within the scope of the present invention, including alternative number of layers, alternative product shapes, and alternative orientations of layers. The hard and brittle confection layer of the present invention may be provided in combination with other layers (as described above), or

provided independently as one single layer. Each of these are more specifically set forth in detail below in the provided Examples.

EXAMPLES

[0066] Confection Examples 1 - 8: Confectionary examples, in accordance with the present invention, were produced having two brittle, at least partially crystallized confection layers made by the crystallization process previously described, and having one chewing gum layer. The resulting crystallized (i.e., crystalline) confection layers were perceived as brittle and crunchy when chewed less than 1 hour after the crystallized confection mass left the extruder. The chewing gum layer was perceived as softer than the crystallized confection layers.

[0067] Table 1 includes the formula of the chewing gum layer of the confectionary Examples 1 - 8. All components are wt. % dry solids.

Table 1: Chewing Gum Formula		
		wt. %
Gum Base		31.0
Sorbitol Sweetener		54.4
Maltitol Syrup		11.0
Flavor, Coolants, Color		2.6
High Intensity Sweeteners		1.0
Total		100.0

[0068] The chewing gum layer was made by standard chewing gum process, including extrusion of the gum mass into an extruded ribbon shape.

[0069] Table 2 includes the formulas of the crystalline (e.g., crystallized) confection layers of Examples 1 - 8. All components are wt. % dry solids. The crystallized confection layer formulas contained less than 10 wt. % water.

Table 2: Confection Layer Formula								
Example #	1	2	3	4	5	6	7	8
Sweetener								
Isomalt	99.0							
Sorbitol		99.0						
Maltitol			99.0					
Xylitol				99.0				
Erythritol + Isomalt					99.0			
Erythritol + Polydextrose						99.0		
Mannitol + Polydextrose							99.0	
Sucrose								99.0
Color, Flavor, HIS	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

[0070] The crystalline confection masses of Examples 1 – 8 were processed in accordance with the process as previously described, and under the temperature conditions set forth in Table 3. The sweetener and additional ingredients (such as color, flavor and/or high intensity sweetener (HIS)) were pre-mixed. The resulting premixed confection mass was added in to a gravimetric blender attached to an extruder (Coperion ZSK-25). The extruder comprised two intermeshed screws, rotating in the same direction, located along the longitudinal length of the extruder chamber from the entrance port to a die plate. With Examples 1 - 5 and 8, a separate die head apparatus containing a die plate was attached to the extruder as can be seen. Table 3 further provides specific process conditions used to make different batches of the crystalline confection layers with the formulas in Table 2.

[0071] The gravimetric blender fed the confection mass powder into the first section of the extruder where it was further mixed. The mixed confection mass was then conveyed to the second section of the extruder, where the confection mass was mixed and melted. The melted confection mass was then conveyed to the third section of the extruder wherein the confection mass was cooled and

mixed in such a way as to create crystal growth. The confection mass was then conveyed to a fourth section of the extruder. With Examples 1 - 5 and 8, the confection mass was conditioned in the die head apparatus and then conveyed through a die plate. With Examples 6 and 7, there was no conditioning of the confection mass before the mass was conveyed through the die plate. In all examples, the crystalline confection layers (e.g., masses) were combined with a chewing gum layer. In all examples, the crystalline confection layers were hard, brittle and crunchy in less than one hour after the confection mass exited the extruder.

[0072] Confection layers were made under processing conditions (set forth in Table 3) that allowed them to be fluid enough to exit the die plate, and yet firm enough to maintain a ribbon shape through the combining of layers into a final three layer product. Temperature ranges in Table 3 include ramping up and/or ramping down temperatures in each section, which was done by extruder sections having sub-sections that could be independently temperature controlled. Depending on the design of the extruder used to make each example, the back pressure created within the extruder was sometimes measured at the end of the extruder (near but before the die), or alternatively, in the middle of the third section of the extruder.

Table 3: Extrusion Crystallization Temperature and Pressure Conditions									
Example #	1	2	3	4	5	6	7	8	
Confection	Isomalt	Sorbitol	Maltitol	Xylitol	Erythritol + Isomalt	Erythritol + Polydextrose	Mannitol + Polydextrose	Sucrose	Range to Cover All Confections
First Section Temp. MIXING	22	22	22	22	22	22	22	20	20 - 22°C
Second Section Temp. MELTING	60 - 180	60 - 100	60 - 170	60 - 100	60 - 160	90 - 130	80 - 170	170	60 - 180°C

Third Section Temp. CRYSTALLI ZATION	100 — 103	80 - 95	60 - 130	60 - 65	110 - 90	120 - 70	130 - 100	170	60 - 170°C
Fourth Section and/or Die Plates Temp. CONDITION ING	135 — 150	95 - 103	130 - 150	90 - 105	115 - 130	only die plate	only die plate	190	90 - 190°C
Pressure in Third Section (at midpoint)	300 — 900	350	950	350	500	NA	NA	NA	300 – 950psi
Pressure in Third Section (at end)	600	350 - 400	350 - 950	300 - 350	NA	NA	NA	600	300 – 950psi

Temperatures in °C. Pressure in psi.

[0073] With each of Examples 1 - 8, two crystalline confection layers were combined with one extruded chewing gum layer. After the layers were combined, they were rolled (i.e., pressed with rollers) while the layers were still warm in order to make them stick together. The resulting crystalline layers were found hard, brittle, and crunchy in less than one hour after the crystalline layers exited the extruder. The crystalline confection layers became hard and brittle when they reached room temperature.

[0074] Confection Examples 9 - 10: Confectionary examples, in accordance with the present invention, were produced having a single brittle confection layer. Calorimetry. The two examples were produced using the four section process previously described. Example 9 confection contained 99 wt. % isomalt. Example 10 confection contained 99 wt. % sorbitol. Additional ingredients in Examples 9 and 10 included flavor, color, and HIS.

[0075] Tables 4 and 5 provide the processing conditions used to produce Examples 9 and 10. The process used for making both Examples 9 and 10 was the four section process illustrated in Figure 3, with extruder sections having sub-sections (also called extruder barrels "B"). Section 1 contained one sub-section (B1). Section 2 contained three sub-sections (B2-B4). Section 3 contained five sub-sections (B5 - B10). Section 4 (i.e., die head apparatus) contained three sub-sections (B11 - B13). As previously described, the sub-sections were used to ramp up and/or ramp down the temperatures in the extruder process sections.

Table 4: Processing Conditions For Example 9 (Isomalt).

	TWIN SCREW EXTRUDER										DIE HEAD		
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
ISOMALT	22	40	150	145	110	110	105	105	105	105	130	113	135

Temperature in °C..

Table 5: Processing Conditions For Example 10 (Sorbitol)

	TWIN SCREW EXTRUDER										DIE HEAD		
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
SORBITOL	22	40	100	100	80	80	80	80	75	75	95	95	105

Temperature in °C.

[0076] The pressure was 670 psi for isomalt (Example 9) and 700 psi for sorbitol (Example 10) in the third processing section of the extruder described in Tables 4 and 5 (that is, in section B10).

[0077] The percent of sweetener in a confection mass, which is in its crystal form can be measured by different methods including, but not limited to, Differential Scanning Calorimetry (DSC). With DSC, the crystal content is determined by measuring the thermal properties of a confection sample as it is heated. A confection mass that contains a sweetener will show a DSC profile for the sweetener in an amorphous form (i.e., glass) or in a crystalline form. A sweetener in an amorphous form will show a DSC temperature plot with a transition temperature. A sweetener in crystalline form will show a DSC

temperature plot with a distinct, sharp melting temperature. The sharp melting temperature will be at the melting point temperature of the sweetener as if it was in pure form outside of the confection mass. The amount of sweetener in crystal form in a confection mass can be calculated using the area under the DSC plot melting point peak and the heat of fusion of the sweetener in pure crystalline form [i.e., (area under curve/heat of fusion)x100 = % crystalline content].

[0078] Pieces of Examples 9 and 10 were found to be hard, brittle, and crunchy when chewed within one hour of exiting the extruder and having reached room temperature. The amount of crystal content in these confection layers after they reached room temperature was calculated using data from Differential Scanning Calorimetry plots run on each of these Examples. Using the DSC plot results, the crystal content was calculated as 71.8 wt. % for the isomalt containing Example 9, and as 87.4 wt. % for the sorbitol containing Example 10.

[0079] Confection Examples 11 - 14: Confection examples, in accordance with the present invention, were produced having a single brittle confection layer, or mass. The layers (i.e. masses) may be in combination with other layers, or provided individually. The resulting crystalline (i.e., crystallized) confection masses were perceived as hard, brittle, and crunchy when chewed less than 1 hour after the extruded confection mass left the extruder die plate and the confection reached room temperature. Examples 11 - 14 further illustrate examples having isomalt, sorbitol, maltitol and a combination of erythritol and isomalt created hard and brittle confection masses under the process steps illustrated in Figure 3. The processing conditions used to make these examples fell within the process temperature ranges listed in Table 3. Example 11 contained 100 wt. % isomalt. Example 12 contained 100 wt. % sorbitol. Example 13 contained 100 wt. % maltitol. Example 14 contained 90 wt. % erythritol and 10 wt. % isomalt. Additional ingredients were not added to initiate and control the crystal growth of these sweeteners using the process of the present invention.

[0080] Table 6: Processing Conditions For Examples 11 - 14.

Table 6: Process Conditions (Temperature C)													
Section	1	2				3					4 (Die Head Apparatus)		
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
#11 Isomalt	22	60	145	140	100	100	100	100	100	100	145	145	150
# 12 Sorbitol	22	60	100	100	80	80	75	75	75	75	95	100	100
# 13 Maltitol	22	60	150	145	100	100	100	95	95	95	130	135	150
# 14 Erythritol:Isomalt	22	60	130	130	110	90	90	90	90	90	115	115	130

Table 6 provides the processing conditions used to produce crystallized confections of Examples 11 - 14. With making Examples 11 - 14, the four section process illustrated in Figure 3 was used, with sections 2 - 4 having sub-sections (also called extruder barrels "B"). Section 1 contained one sub-section (B1). Section 2 contained three sub-sections (B2-B4). Section 3 contained five sub-sections (B5 - B10). Section 4 (i.e., die head apparatus) contained three sub-sections (B11 - B13). Sub-sections were used to ramp up and/or ramp down the temperatures in each extruder process sections.

[0081] Each of the provided Examples further illustrates the presently claimed invention.

[0082] The scope of the claims should not be limited by the preferred embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description as a whole.

What is claimed is:

1. A process for making a confection, comprising the steps of:
 - a) mixing a confection mass containing at least 80 wt. % sweetener;
 - b) melting the confection mass, such that all the sweetener in the confection mass is melted;
 - c) crystallizing the confection mass, such that at least 60 wt. % of the sweetener in the confection mass is in crystal form; and
 - d) forming the confection mass,wherein
the melting of the confection mass is at a temperature between 40°C – 190°C;
the crystallizing of the confection mass is at a temperature between 50°C – 180°C ; and
the mixing, melting, and crystallizing steps are performed in an extruder.
2. The process for making a confection of claim 1, wherein the formed confection is crunchy at 20 °C – 27 °C.
3. The process for making a confection of claim 1 or 2, wherein the forming of the confection mass includes passing the confection mass through a die plate slit, die plate hole, or other opening to create a ribbon, sheet, or rope of confection mass.
4. The process for making a confection of any one of claims 1 to 3, wherein the forming of the confection mass includes forming of the confection mass into individual pieces.
5. The process for making a confection of any one of claims 1 to 4, further comprising the step of finishing.
6. The process for making a confection of any one of claims 1 to 5, wherein the finishing is selected from the group consisting of embossing, debossing, spraying with liquid, dusting with particulates or powder, pressing, scoring, cutting, forming, shaping, and any combination thereof.
7. The process for making a confection of any one of claims 1 to 6, wherein the confection mass contains at least 90 wt. % sweetener.
8. The process for making a confection of any one of claims 1 to 7, wherein at least 70 wt. % of the sweetener is in crystal form.
9. The process for making a confection of any one of claims 1 to 8, wherein the mixing of the confection mass is at a temperature between 20°C – 40°C.
10. The process of claim 9, wherein the mixing of the confection mass is at a temperature between 20°C-27°C.

11. The process of any one of claims 1 to 10, wherein the conditioning of the confection mass is done at 80°C – 225 °C.
12. The process of any one of claims 1 to 11, wherein the crystallizing of the confection mass is at a pressure between 300 – 1000 psi.
13. The process of any one of claims 1 to 12, further comprising the step of conditioning.
14. The process of claim 13, wherein the conditioning step is performed in an extruder.
15. The process of any one of claims 1 to 14, wherein the extruder comprises a screw configuration extending through the extruder that mixes and conveys the confection mass through the extruder.
16. The process of claim 15, wherein the screw configuration comprises two intermeshed screws designed to mix and convey the confection mass from an entrance port of the extruder to an exit die plate of the extruder as the two screws rotate in the same direction.
17. The process of claim 16, wherein the screw configuration comprises two intermeshed screws designed to mix and convey the confection mass from an entrance port, through the mixing step, the melting step, and the crystallizing step of the extruder as the two screws rotate in the same direction.
18. The process of any one of claims 1 to 17 for making a multilayered confection, comprising the steps of:
 - a) performing the steps of any one of claims 1 - 17 whereby to create at least one crunchy confection layer containing at least 80 wt. % sweetener, with at least 60 wt. % of the sweetener in crystal form;
 - b) creating at least one other confection layer, wherein the confection layer is a chewy layer; and
 - c) combining the at least one crunchy confection layer and the at least one other layer.
19. The process for making a multilayered confection of claim 18, further comprising the step of finishing the combined confection by at least one process selected from the group consisting of embossing, debossing, spraying with liquid, dusting with particulates or powder, pressing, scoring, cutting, forming, shaping, and any combination thereof.

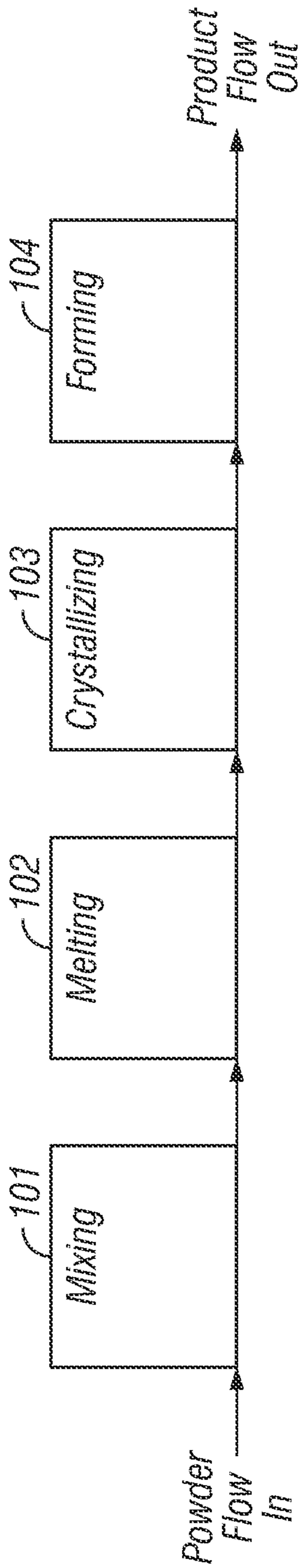


FIG. 1

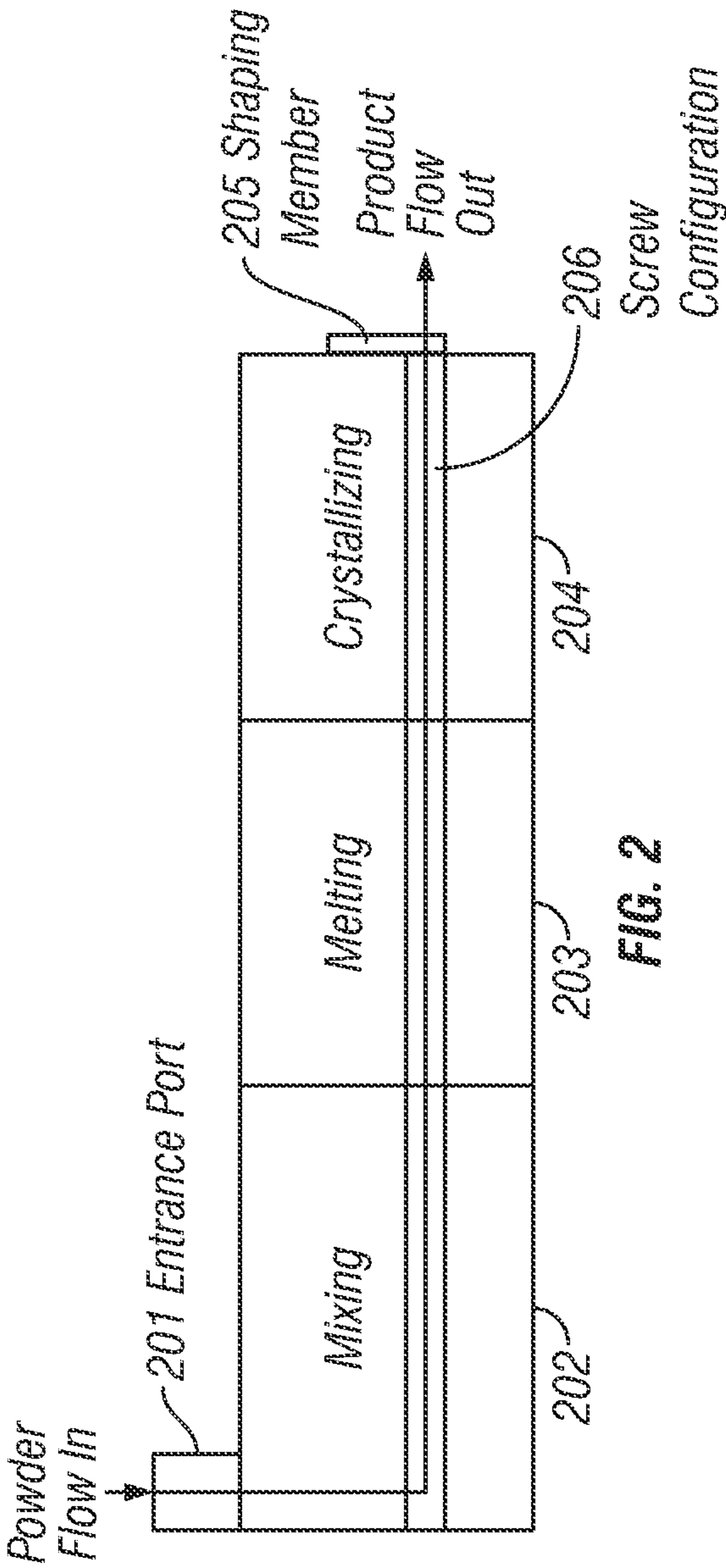


FIG. 2

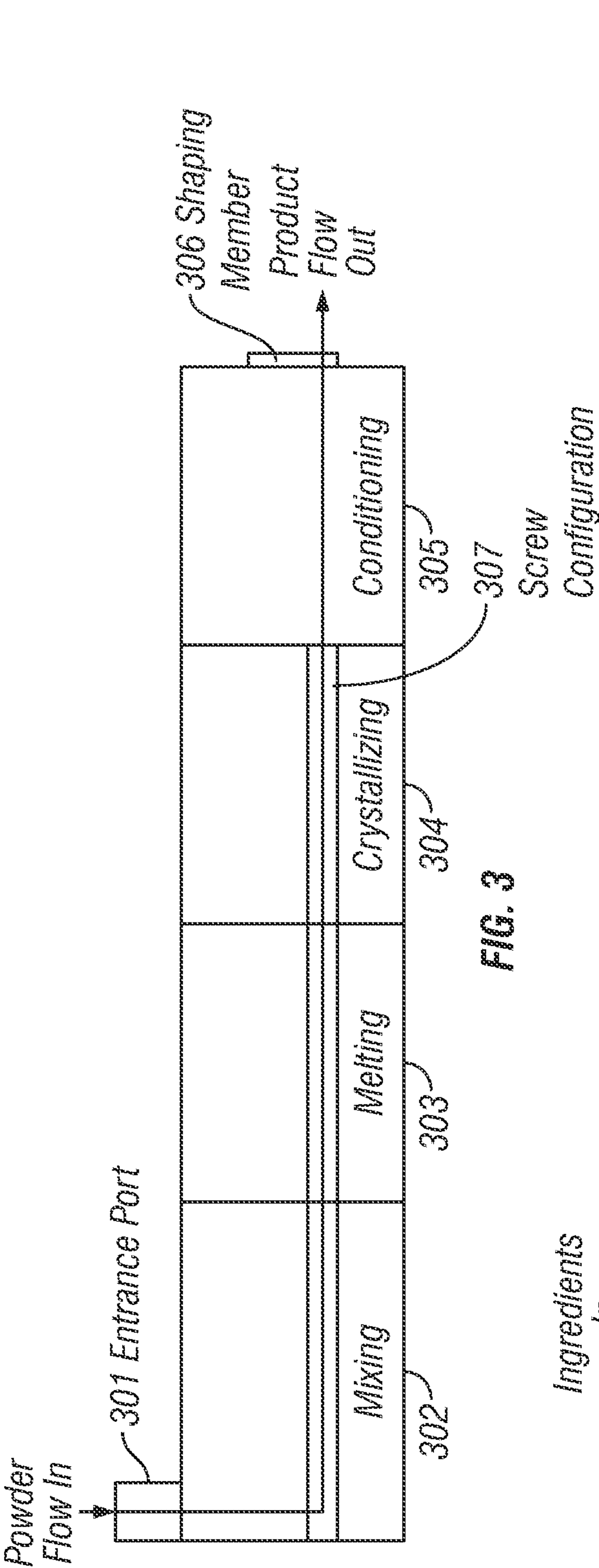


FIG. 3

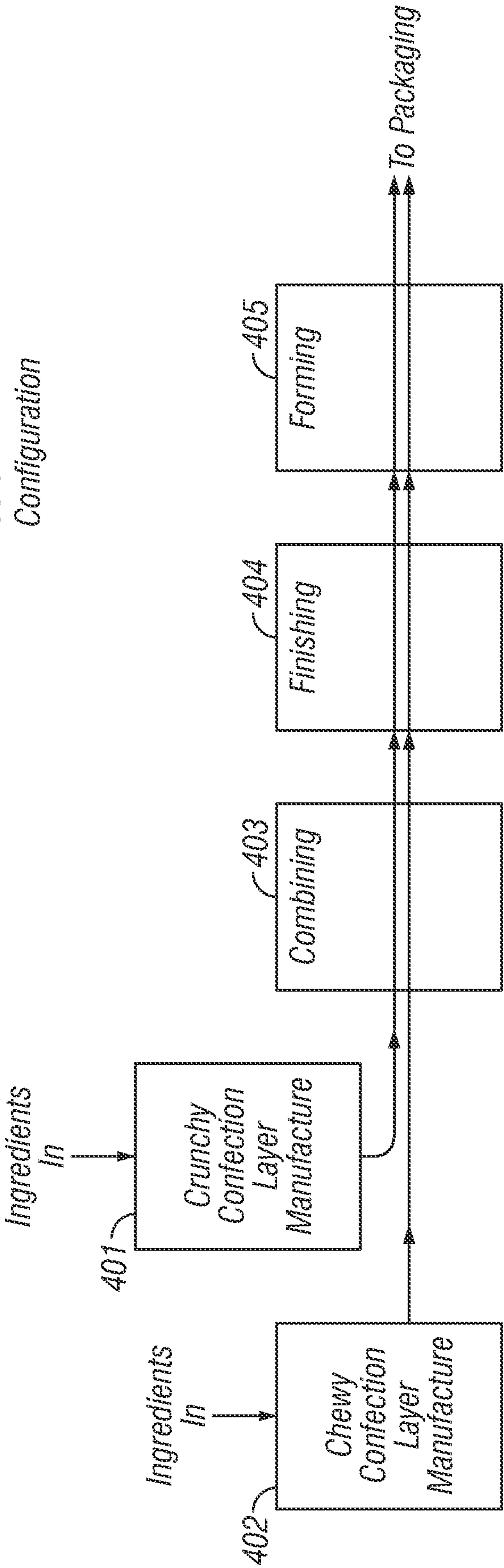


FIG. 4

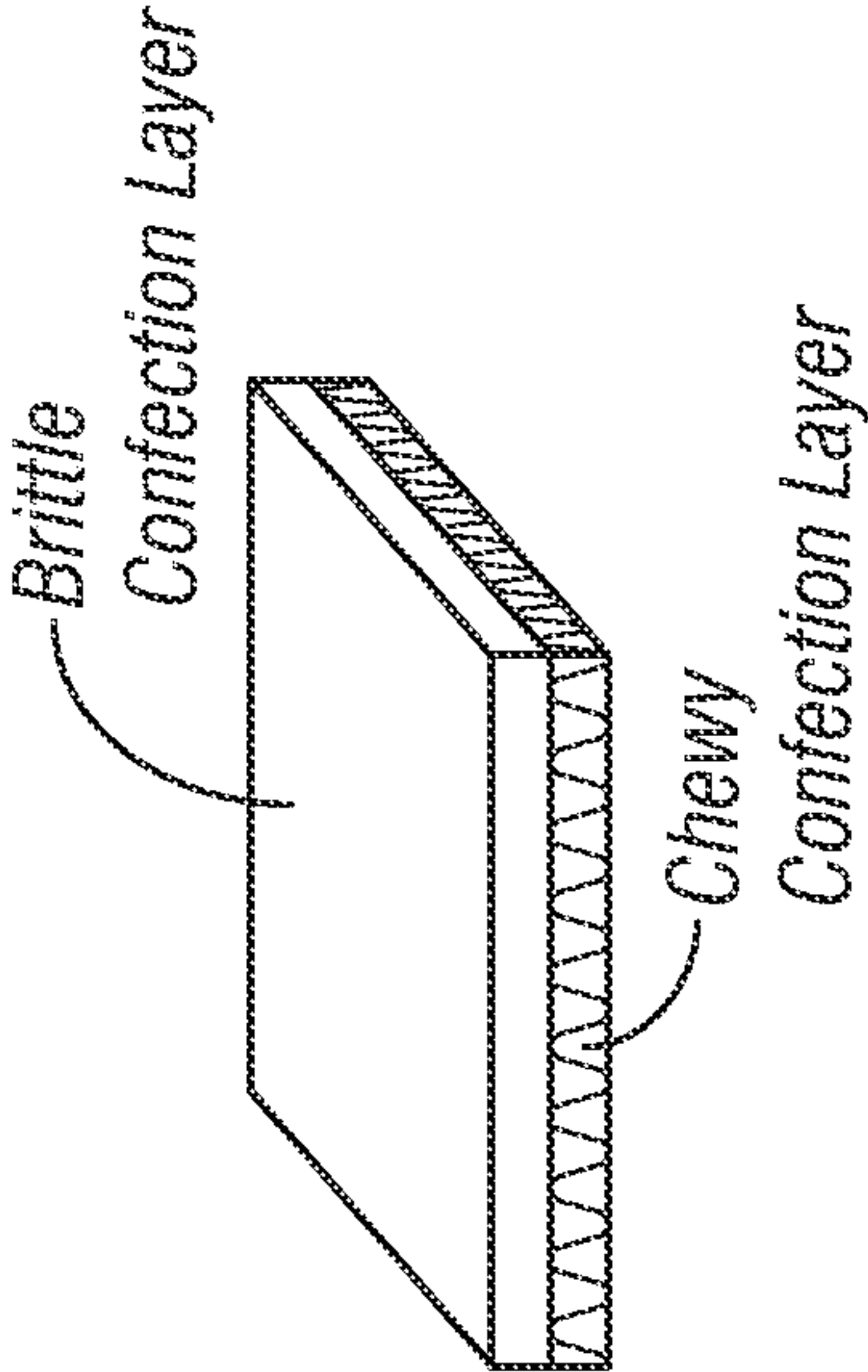


FIG. 6

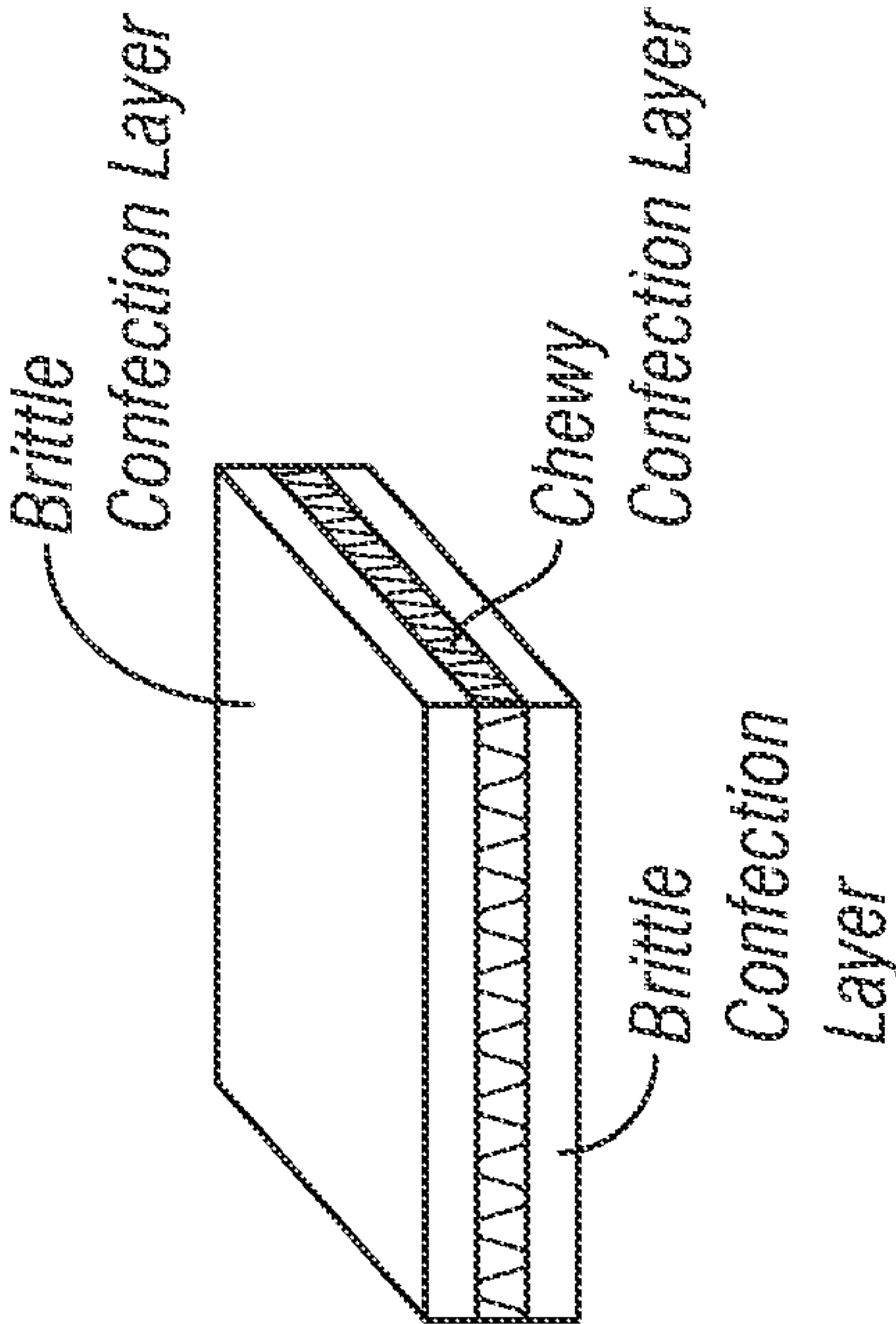


FIG. 5

