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(54) A freezing mould bag

Gefrierformbeutel

Poche moulante de congélation

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EP 0 616 948 B1

Description

The present invention relates to a freezing mould bag, especially for freezing ice lumps or ice cubes, and more precisely a freezing mould bag providing a self-closing effect, and comprising: two sheets of a foil material, said sheets being of substantially

identical geometrical shape and defining an outer periphery,
a peripheral joint extending along the majority of said outer periphery of said sheets, except for a peripheral area constituting an inlet opening of said bag, said peripheral joint joining said sheets together in substantially overlapping relationship and defining an inner space within the interior of said bag, said inner space constituting at least one mould compartment, and preferably a plurality of mould compartments being interconnected and being defined by separate joints of said sheets,
an inlet channel defined by separate joints of said sheets and extending from said inner space of said bag to said inlet opening so as to provide access from the environment to said inner space of said bag through said inlet channel,
two closure valve flaps connected to said sheets at said inlet opening and extending from said inlet opening within the interior of said bag towards said inner space of said bag along said inlet channel, said closure valve flaps being joined together and being joined to said sheets through said separate joints defining said inlet channel so as to provide two closure pockets being open towards said inner space of said bag,
said inlet channel comprising a first segment and a second segment, said first segment being provided adjacent to said inlet opening, and said second segment interconnecting said first segment and said mould compartment or mould compartments, said first segment tapering towards said second segment, said first segment and said second segment defining at their transition a constriction,
said inlet channel defining a first direction constituting the longitudinal direction of said inlet channel, and a second direction in a plane parallel with said two sheets perpendicular to said first direction, and said closure valve flaps extending from said inlet opening beyond said constriction at said transition,

Numerous freezing mould bags are known within the art, e.g. from US Patent No. 3,207,420, Re-issued US Patent No. 31,890, US Patent No. 4,822,180, corresponding to European Patent No. 0 264 407, European Patent Application No. 0 129 072, International Patent Application, Publication No. WO82/00279, International Patent Application, Publication No. WO87/01183, and International Patent Application, Publication No. WO86/04561, to which Patents and Patent Applications reference is made, and which US Patents are herewith incorporated in the present specification by reference.

In the above-mentioned reissued US Patent No. Re 31,890, a freezing mould bag is described and disclosed, vide Fig. 7 and the corresponding part of the specification, comprising two closing flaps providing a check valve of a self-closing freezing mould bag.

European Patent No. 0 264 407 also discloses a freezing mould bag of the above described type which bag according to the specification of the European Patent is adapted to provide a self-closing function. The freezing mould bag according to the European Patent No. 0 264 407 comprises two closure flaps defining closure pockets of the freezing mould bag and is stated to seal the interior of the freezing mould bag and to prevent that liquid or water leaks from the interior of the freezing mould bag, provided the interior of the freezing mould bag is filled with liquid, preferably water, intended to be frozen to ice lumps or ice cubes. A particular safe self-closing funtion is stated to be obtained through the provision of the closure pockets extending in the entire length of, but not more than, the length of the inlet channel and through the provision of a set of double weld seams defining the constriction.

In the specification of the above-mentioned European Patent No. 0 264 407 it is specifically explained how the self-closing function is established as the freezing mould bag is initially completely evacuated prior to the stage of filling the freezing mould bag with liquid or water to be frozen within the freezing mould bag, and as the filling of the freezing mould bag results in a complete filling of the closure pockets of the freezing mould bag. The complete filling of the closure pockets of the freezing mould bag further results in that the closure flaps of the freezing mould bag are pressed against one another in consequence of tensioning of the foils of the freezing mould bag, which tensioning is established in specific weld seams providing a constriction of an inlet channel of the freezing mould bag, which inlet channel is of a configuration basically tapering from an inlet opening of the freezing mould bag towards the interior of the freezing mould bag. Thus, the complete filling of the interior of the freezing mould bag is consequently based on a completely evacuated state of the interior of the freezing mould bag prior to the filling of the interior of the freezing mould bag and a complete filling of the interior of the freezing mould bag, and specifically a complete filling of the closure pockets of the freezing mould bag.

European Patent Application No. 0 129 072 further describes a freezing mould bag which according to the specification of the European Patent Application is adapted to generate a far more elaborated self-closing function as compared to the function of the freezing mould bag according to the above-mentioned European Patent No. 0 264 407. Thus, it is stated that a self-closing function is established even though the closure pockets are not completely filled with liquid or water, as the freezing mould bag according to the above-men-

tioned European Patent Application No. 0 129 072 is stated to be adapted to provide a self-closing function independent of a complete or partial filling out of the interior of the freezing mould bag with liquid or water. The self-closing function of the freezing mould bag according to the above-mentioned European Patent Application No. 0 129 072 is stated to be provided by means of a narrow, tubular inlet arranged within an inlet channel of the freezing mould bag and extending from the interior of the freezing mould bag through the inlet channel to a position approximately half-way along the inlet channel along the longitudinal direction of the inlet channel, in which position the tubular inlet is connected to two sheets of the freezing mould bag defining two closure pockets.

The freezing mould bag according to the above-mentioned European Patent Application No. 0 129 072, however, has proven not to function absolutely satisfactorily as the freezing mould bag does not provide a safe and reliable self-closing function, i.e. the freezing mould bag does not guarantee that there is every probability that the freezing mould bag is closing as the freezing mould bag is turned upside down for generating a self-closing function after a complete or partial filling of the interior of the freezing mould bag with liquid or water. This lack of reliability is believed to be based on the following relations. The closure pockets are, on the one hand, in consequence of the small size of the closure pockets unable to generate a pressure capable of closing the inlet channel of the- freezing mould bag. The structure of the freezing mould bag according to the above-mentioned European Patent Application No. 0 129 072 is, on the other hand, not deduced, taking into due consideration the hydrodynamic and hydraulic relations which, as will be explained below with reference to the detailed discussion of the realization on which the present invention is based, may be utilized for creating a safe and reliable self-closing function, i.e. a self-closing function which, as the self-closing mould bag is completely or partially filled with liquid or water, and as the freezing mould bag is turned upside down, provides a substantially fail-safe closing of the interior of the freezing mould bag independent of whether or not the closure pockets are filled with liquid or air at the time the self-closing freezing mould bag is turned upside down.

An object of the present invention is to provide a freezing mould bag which in a safe and reliable manner is capable of generating a self-closing effect as the freezing mould bag is turned upside down, i.e. turned from a position in which an inlet opening of the freezing mould bag is facing upwardly to a position in which the inlet opening is facing downwardly, independent of whether or not the interior of the freezing mould bag is filled completely or partially with liquid or water so as to guarantee that the liquid or water contained within the interior of the freezing mould bag is confined within the interior of the freezing mould bag and so as to limit the amount of liquid or water which is spilt from the freezing mould bag as the freezing mould bag after filling is turned upside down to substantially no more than an amount of liquid or water confined within a section or segment of an inlet channel of the freezing mould bag and to prevent that liquid or water not confined within the interior of the freezing mould bag is spilt.

The above object, numerous other objects, features and advantages which are readily understood by a person having ordinary skill in the art from the below detailed description of the present invention are obtained by a freezing mould bag of the kind defined above and being characterized in that the closure valve flaps extend from the inlet opening beyond the constriction at the transition between the first and the second segment of the inlet channel to a position at the centre of the second segment.

The present invention is based on the following realization. The length of the valve closure flaps is, as will be readily understood by a person having ordinary skill in the art, of importance, firstly as to the amount of liquid or water which is spilt as the freezing mould bag is turned upside down after the filling of the interior of the freezing mould bag with liquid or water, as a part of the amount of water or liquid which is contained within the inlet channel is expelled as the freezing mould bag is turned upside down, and secondly as to the flowing of the liquid or water from the interior of the freezing mould bag into the closure pockets. Experiments have revealed that closure valve flaps implemented in accordance with the freezing mould bag according to the present invention, fulfil the requirements as to, on the one hand, the spilling of a minimum amount of water or liquid and, on the other hand, a swift and efficient filling of the closure pockets.

The closure valve flaps of the freezing mould bag according to the present invention may be constituted by separate flap components which may be made from the same material as the sheets of the freezing mould bag or a different material of increased or reduced flexibility. In accordance with the presently preferred embodiment of the freezing mould bag according to the present invention, the closure valve flaps are constituted by turned-in parts of the sheets. According to the preferred embodiment of the freezing mould bag according to the present invention, the closure valve flaps are consequently constituted by integral components or parts of the sheets of the freezing mould bag. In case the closure valve flaps are constituted by separate components or parts, the closure valve flaps may be fastened to the sheets through joints which may be established through glueing or welding, dependent on the specific materials of the sheets and the closure valve flaps of the freezing mould bag.

In order to obtain an efficient self-closing of the freezing mould bag according to the present invention, the closure valve flaps preferably extend to a position defining a distance from the constriction at the transition between the first and the second segment of the inlet

channel being at least 0.5 times the dimension of the constriction along the second direction, i.e. along the direction perpendicular to the longitudinal direction of the inlet channel, preferably 0.5-2 times the dimension of the constriction. According to the presently preferred embodiment of the freezing mould bag according to the present invention, the second segment has a maximum dimension along the second direction of at least two times the dimension of the constriction along the second direction. The freezing mould bag according to the above described presently preferred embodiment of the freezing mould bag exhibits a reliable and efficient self-closure effect.

In accordance with the presently preferred embodiment of the freezing mould bag according to the present invention, the second segment of the inlet channel has a maximum dimension along the second direction of the inlet channel being 2-7 times the dimension of the constriction, further preferably 2.4-5 times the dimension of the constriction, such as 2.6-3.4 times the dimension of the constriction.

Preferably, in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention the first segment of the inlet channel has a dimension, along the second direction of the inlet channel, i.e. perpendicular to the longitudinal direction of the inlet channel, at the inlet opening being approximately two times the dimension of the constriction along the second direction.

Preferred and advantageous dimensions of the parts and components of the freezing mould bag are discussed in the below detailed description of the presently preferred embodiment of the freezing mould bag according to the present invention and the below Example.

The first segment of the inlet channel tapering from the inlet opening towards the interior of the freezing mould bag may be bounded by joints of any appropriate configuration. The first segment of the inlet channel may, consequently, be bounded by joints constituting straight lines or curved lines defining a first segment of a convex or concave configuration. However, the joints defining the first segment are preferably constituted by straight lines or curved lines defining a first segment of a basically concave configuration.

The second segment of the inlet channel may be bounded by joints of any appropriate configuration. The second segment of the inlet channel may, consequently, be bounded by joints constituting straight lines or curved lines, however, preferably constituting partly straight lines and partly curved lines, such as segments of circles defining a second segment of a convex or concave configuration, preferably a second segment of a concave configuration.

The inlet channel comprising the first and the second segment may, fulfilling the above described requirements, be of an unsymmetrical configuration and further be of an overall curved configuration. However, in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention, the inlet channel is substantially symmetrical relative to its longitudinal axis.

According to the presently preferred embodiment of the freezing mould bag according to the present invention, the freezing mould bag comprises a plurality of mould compartments, preferably more than two mould compartments, further preferably more than twelve mould compartments, such as eighteen or twenty-four mould compartments.

The feature discussed above regarding the dimensions of the second segment of the inlet channel, is in accordance with the teaching of the present invention and in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention fulfilled, provided the second segment has a size corresponding to approximately 1-2 times a single mould compartment, preferably 2 times a single mould compartment.

The configuration of the second segment having dimensions so as to provide the second segment having a size larger than the size of a single mould compartment further serves the purpose of informing the consumer that the second segment is different from mould compartments in which ice lumps or ice cubes are contained, as the ice lump or ice cube which is made from the liquid or water confined within the second segment of the inlet channel contains segments of the closure valve flaps frozen within the liquid or water, which segments are later on liberated, as the ice lump or ice cube is thawed.

The sheets of foil material from which the freezing mould bag is composed or made, and from which the closure valve flaps in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention are made from turned-in parts of the sheets, are preferably manufactured by cutting segments of continuous paths of foil material as will be well-known within the art. The sheets of foil material may further constitute segments of planar foil paths or segments of foil paths provided with printings corresponding to the mould compartments of the freezing mould bag. Prior to the operation of cutting the two segments constituting the two sheets of the freezing mould bag according to the present invention from a single continuous foil path or from two continuous foil paths, which segments are subsequently to be joined together for creating the freezing mould bag according to the present invention, one of the continuous foil paths, in case a single continuous foil path is used, from which both segments are cut or punched, or in case only one of the segments is provided with printings, or alternatively both continuous foil paths in case two continuous foil paths are employed for providing two segments to be joined together constituting the freezing mould bag according to the present invention, is or are brought into contact with one or more printing tools, such as a

punching tool or a heat-printing tool, e.g. a heated printing dye for generating the above-mentioned printings corresponding to the mould compartments of the freezing mould bag. The generation of printings of the sheets of the freezing mould bag or of one of the sheets of the freezing mould bag, in case the freezing mould bag is not of a symmetrical configuration, may serve the purpose of allowing an increased filling of the interior of the freezing mould bag and consequently provide larger ice lumps or ice cubes within the same dimensions of the freezing mould bag as compared to a freezing mould bag, the sheets of which are not provided with printings corresponding to the mould compartments of the freezing mould bag.

The sheets from which the freezing mould bag is produced may be constituted by plastic foil sheets or aluminum foil sheets, and the joints may be constituted by welded joints or glue joints. The sheets may further be constituted by laminates of e.g. plastics material and metal foil or plastic foils to which a metal coating is applied in an evaporation process. The choice of foil material and the choice of the thickness of the foil material or foil materials firstly depends on the consideration regarding, on the one hand, the provision of a hermetically sealed freezing mould bag, i.e. a freezing mould bag which does not leak unintentionally and, on the other hand, the provision of a freezing mould bag which after the operation of freezing the liquid or water to e.g. ice lumps or ice cubes is easily openable by cutting or tearing the sheets apart, and secondly depends on the provision of an efficient self-closing effect,

The invention will now be further described with reference to the drawings, in which

Fig. 1 is a schematical view of a presently preferred embodiment of the freezing mould bag according to the present invention,

Figs. 2 and 3 are schematic, sectional and perspective views of the presently preferred embodiment of the freezing mould bag according to the present invention, illustrating the freezing mould bag in a completely filled state having the inlet channel facing upwardly and having the inlet channel facing downwardly, respectively, illustrating the venturi effect, characteristic of the present invention,

Fig. 4 is a schematical view of a second embodiment of a freezing mould bag according to the present invention, and

Fig. 5 is a sectional view of the second embodiment of a freezing mould bag shown in Fig. 4 as viewed along the sectional line V-V.

In Fig. 1, a first, presently preferred embodiment of a freezing mould bag according to the present invention is shown in a plane and schematical view. The freezing mould bag is in its entirety designated the reference numeral 10. The freezing mould bag 10 is, as will be evident from the perspective and sectional views of Figs. 2 and 3, illustrating the interior of the freezing mould bag composed of two identical plastic sheets, preferably sheets of LD polyethylene foil of a thickness of 25 μm, or alternatively HD polyethylene foil of a thickness of 18 μm, the sheets being designated the reference numerals 12 and 14. Each of the sheets 12 and 14 comprises a turned-in part designated the reference numerals 16 and 18, which turned-in parts extend within the interior of the freezing mould bag 10 defining inner edges 17 and 19, respectively. The sheets 12 and 14 are of a substantially rectangular configuration and are arranged in an overlapping juxtaposed relationship in which the above-mentioned turned-in parts 16 and 18 extend into the interior of the freezing mould bag 10, as the sheets 12 and 14 are joined together through partly a peripheral joint 20 extending along the periphery of the sheets 12 and 14, except for an area to be described below, and partly octagonal, discretely arranged joints 22 which together, and together with the peripheral joint 20, define a total of 24 individual mould compartments, one of which is designated the reference numeral 24.

At a central area of the edge of the freezing mould bag 10, which edge is defined by the turned-in parts 16 and 18 of the sheets 12 and 14, respectively, the circumferential joint 20 is interrupted as the sheets 12 and 14 are not joined together at this area so as to provide an inlet opening at said area, which inlet opening constitutes an inlet opening of an inlet channel extending from the environment to the interior of the freezing mould bag 10. Said area defining the inlet opening of the inlet channel is designated the reference numeral 26. From the above-mentioned edge, mutually convergent joints 28 extend towards the interior of the freezing mould bag 10, which joints 28 terminate in circularly configurated reinforcing joints 30. The mutually convergent joints 28 define a first segment of the inlet channel of the freezing mould bag 10 beyond which first segment mutually divergent joints 32 define a second segment of the inlet channel, which second segment has dimensions in a direction perpendicular to the inlet direction or the longitudinal direction of the inlet channel far larger than the corresponding dimensions of the first segment of the inlet channel. The above-mentioned circular reinforcing joints 30 define a constriction at the conjunction or the transition between the first and the second segment of the inlet channel, which constriction serves a specific purpose in accordance with the teachings of the present invention, as will be described in greater detail below.

In Fig. 1, the two sheets 12 and 14 of the freezing mould bag are arranged in a substantial planar juxtaposed position as the interior of the freezing mould bag may be partially filled with air defining air pockets within the interior of the freezing mould bag. In Fig. 1, the freezing mould bag 10 is shown having its inlet opening 26 facing to the right, which inlet opening 26, as is evident from Fig. 2, is facing upwardly as the freezing mould bag is being filled with liquid, preferably or specifically water to be frozen to ice lumps or ice cubes. In the

present context, expressions such as upwardly, downwardly, upper, lower, etc. refer to an orientation of the freezing mould bag in relation to the vertical direction defined by the gravitational force, which expressions are merely to be understood describing the normal overall orientation of the freezing mould bag when in use as, of course, a larger or minor part of the freezing mould bag may be folded relative to a specific direction such as the vertical direction and as the freezing mould bag in its entirety may be kept in a sloping orientation relative to a specific direction such as the vertical direction.

Fig. 2 is a sectional view of an upper part of the freezing mould bag 10 disclosing the freezing mould bag 10 after the completion of the operation in which the interior of the freezing mould bag is filled with liquid, preferably or specifically water to be frozen to ice lumps or ice cubes, through the inlet opening 26 which is facing upwardly.

As is evident from Fig. 2, the liquid or water fills out the mould compartments 24 which are distended by the water pressure and further fills out the second segment of the inlet channel. By the filling out of the mould compartments 24 and further the filling out of the second segment of the inlet channel defined by the joints 32, the sheets 12 and 14 are distended relative to one another by which distension the turned-in parts 16 and 18 of the sheets 12 and 14 are separated from one another resulting in a separation of the lower edges 17 and 19 of the turned-in parts 16 and 18, respectively, of the sheets 12 and 14. The liquid or water filling out the interior of the freezing mould bag 10 rises within the interior of the freezing mould bag on both sides of the turned-in parts 16 and 18 of the sheets 12 and 14, respectively, as the liquid or water rises within the cavities constituting closure pockets defined between the turned-in parts 16 and 18 of the sheets 12 and 14 and the sheets 12 and 14, respectively, to a specific height determined by the amount of air confined within the cavities or closure pockets. The surfaces of liquid or water rising within the closure pockets are designated the reference numerals 34 and 36. Between the turned-in parts 16 and 18 within the inlet channel, the liquid or water rises to a height corresponding to the upper edge of the inlet opening 26. The surface of the liquid or water present between the turned-in parts 16 and 18 within the first segment of the inlet channel is designated the reference numeral 38. As is evident from Fig. 2, the turned-in parts 16 and 18 of the sheets 12 and 14, respectively, define a basically tapering inlet, guiding the liquid or water into the interior of the freezing mould bag 10. The turned-in parts 16 and 18 further serve the purpose of providing closure valve flaps which seal the interior of the freezing mould bag relative to the environment, as the turned-in parts 16 and 18 of the sheets 12 and 14, respectively, are pressed against one another within the inlet channel. As is evident from Fig. 2, the closing or sealing of the interior of the freezing mould bag 10 is not established at the time at which the liquid or water has been filled into the interior of the freezing mould bag 10 as the air pockets above the liquid or water surfaces 34 and 36 within the closure pockets defined between the sheets 12 and 14 and the corresponding turned-in parts 16 and 18, respectively, thereof, and the presence of liquid or water between the turned-in parts 16 and 18 of the foils 12 and 14, respectively, precludes the generation of a water pressure within the cavities, which water pressure is capable of pressing the closure valve flaps generated by the turned-in parts 16 and 18 against one another.

As the freezing mould bag 10 is turned upside down from its position shown in Fig. 2 to its position shown in Fig. 3 in which the inlet opening 26 faces downwardly, the liquid or water confined between the turned-in parts 16 and 18 of the inlet channel is expelled as indicated by an arrow 41. In consequence of the expelling of liquid or water, a relative pressure drop is generated due to a venturi effect within the constriction defined between the circular reinforcing joints 30 as the inlet channel expands from the constriction towards the inlet opening 26 and as the second or inner segment of the inlet channel defined by the mutually convergent joints 32 constitutes a sort of reservoir from which liquid or water without hindering may flow towards the inlet opening of the inlet channel, i.e. without any substantial reduction of the flow rate of the liquid or channel so as to generate a maximum flow rate through the constriction defined between the circular reinforcing joints 30 of the liquid flowing downwardly from the second segment of the inlet channel due to the gravitational force. By the generation of the relative pressure drop caused by the venturi effect within the constriction between the circular reinforcing joints 30, a force impact on the turned-in parts 16 and 18 of the sheets 12 and 14 is generated, which force impact is illustrated in Fig. 3 by arrows 42. In response to the force impact, the turned-in parts 16 and 18 of the sheets 12 and 14 are caused to collapse and consequently pressed against one another so as to close the inlet channel defined between the turned-in parts 16 and 18 of the sheets 12 and 14 at the constriction, whereupon the liquid or water flowing from the interior of the freezing mould bag 10, more precisely flowing from the second segment of the inlet channel, flows into the closure pockets defined between the foils 12 and 14 and the corresponding turned-in parts 16 and 18, respectively, thereof, generating a complete filling out of the closure pockets. By filling out the closure pockets, the closure pockets are distended, resulting in that the turned-in parts 16 and 18 defining the closure valve flaps are further pressed against one another creating a permanent closing of the freezing mould bag 10.

The permanent closing of the freezing mould bag is further capable of maintaining the freezing mould bag hermetically sealed in case the freezing mould bag is shifted from its position shown in Fig. 3 to a position arranged in a substantially plane orientation on a supporting surface, e.g. a supporting surface of a deep-

freezer or a home freezer in order to guarantee that the amount of liquid or water confined within the interior of the freezing mould bag 10 does not to any substantial extent leak from the interior of the freezing mould bag 10 during the freezing of the liquid or water. After the freezing of the liquid or water confined within the mould compartments 24 of the freezing mould bag 10, the freezing mould bag 10 and the ice lumps or ice cubes may be removed from the deep-freezer or the home freezer, and the ice lumps or ice cubes confined within the interior of the freezing mould bag 10 are easily removed from the freezing mould bag 10 by simple tearing apart or cutting the sheets 12 and 14 of the freezing mould bag 10.

The freezing mould bag 10 is preferably made from sheets of plastics foil material which are cut from a continuous plastic foil path as the above described joints 20,22,28,30 and 32 are preferably made by heat-welding the sheet materials together. Alternatively, the joints may be established by glueing the sheets and the turned-in parts thereof togther. It is to be noticed that the sheets 12 and 14 may be provided with printings corresponding to the mould compartments 24 of the freezing mould bag 10 in order to increase the volume of the ice lump or ice cube which is produced by the amount of liquid or water confined within the mould compartment 24.

Although the freezing mould bag 10 is preferably adapted and intended to be used for freezing water for generating ice lumps or ice cubes, the freezing mould bag 10 in itself, or a modified embodiment of the freezing mould bag, may be used for freezing other materials such as foodstuffs or the like which are frozen in individual minor portions.

In Figs. 4 and 5, a schematical and plane view and a vertical sectional view, respectively, of a second embodiment of the freezing mould bag according to the present invention are shown. The second embodiment basically differs from the above described, presently preferred, first embodiment shown in Figs. 1-3 in that the circular reinforcing joints 30 are omitted and in that the joints 28 defining the first segment of the inlet channel are constituted by linear joints.

In Fig. 4, the reference a indicates the width of the constriction at the conjunction or the transition between the first segment and the second segment of the inlet channel. The reference b designates the distance from the outermost end of one of the joints 28, i.e. the outermost point of the constriction and the innermost end of the second segment in the direction perpendicular to the longitudinal direction of the inlet channel. The reference c designates the distance between the constriction at the width a and the edges 17 and 19 of the turned-in parts 16 and 18, respectively, of the sheets 12 and 14, respectively. The dimensions or distances a, b, and c preferably fulfil the following requirements. The distance b is preferably at least 0.3 times the distance a, further preferably 0.5-3.0 times the distance a, further preferably 0.7-2.0 times the distance a, such as 0.8-1.2 times the distance a. The distance c is preferably at least 0.5 times the distance a, further preferably 0.5-2.0 times the distance a.

Example

A prototype implementation of the presently preferred embodiment of the freezing mould bag according to the present invention shown in Fig. 1 was made from two sheets of 25 μm thick LD polyethylene. Each of the 25 μm thick LD polyethylene sheets 12 and 14 had a width of 18 cm and an overall length of 38.5 cm, as each of the turned-in parts 16 and 18 constituted a turned-in part of a length of 4.5 cm of each of the sheets 12 or 14 of total lengths of 38.5 cm. The length of the freezing mould bag 10 was, consequently, 34 cm. The 24 mould compartments 24 each had a width of 4 cm and a length of 4.5 cm, as the opening between any two adjacent mould compartments was 1 cm. The inlet opening 26 of the inlet channel had a width of 9 cm, and the length of the inlet channel from the inlet opening 26 to the constriction defined between the circular reinforcing joints 30, more precisely to the centres of the circular reinforcing joints 30, was 3.5 cm. The free distance within the constriction defined between the circular reinforcing joints 30 was 18 mm. The maximum width of the second segment of the inlet channel was 7.5 cm, and the length of the second segment of the inlet channel, i.e. the dimension of the second segment of the inlet channel in the longitudinal direction of the inlet channel was 2 cm. The overall length of the inlet channel was, consequently, 5.5 cm, and the edges 17 and 19 of the turned-in parts 16 and 18 defining the closure valve flaps were arranged at a distance of 4.5 cm from the inlet opening. The edges 17 and 19, consequently, were arranged at the centre of the second segment of the inlet channel.

Experiments were made revealing that the freezing mould bag implemented in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention was functioning correctly, as the freezing mould bag was used in accordance with its intentional application, i.e. the freezing mould bag was filled with water as shown in Fig. 2, whereupon the freezing mould bag was turned upside down from its position shown in Fig. 2 to its position shown in Fig. 3, an amount of water was discharged from the freezing mould bag, which amount was substantially identical to the amount of water confined between the closure valve flaps defined by the turned-in parts 16 and 18, i.e. the excess amount of water present between the turned-in parts 16 and 18 of the sheets 12 and 14 after a complete filling of the interior of the freezing mould bag.

The experiments revealed that the prototype implemented in accordance with the presently preferred embodiment of the freezing mould bag according to the present invention provides a safe and reliable self-clos-

ing of the interior of the freezing mould bag in accordance with the venturi effect, characteristic of the present invention, generated within the constriction of the inlet channel prior to a complete filling of the cavities defined between the sheets 12 and 14 and the turned-in parts 16 and 18, respectively, thereof, defining closure valve flaps providing the permanent closing or sealing of the interior of the freezing mould bag relative to the environment.

Claims

1. A freezing mould bag comprising:

two sheets (12,14) of a foil material, said sheets being of substantially identical geometrical shape and defining an outer periphery,
a peripheral joint (20) extending along the majority of said outer periphery of said sheets, except for a peripheral area constituting an inlet opening (26) of said bag (10), said peripheral joint joining said sheets together in substantially overlapping relationship and defining an inner space within the interior of said bag (10), said inner space constituting at least one mould compartment (24), and preferably a plurality of mould compartments (24) being interconnected and being defined by separate joints (28) of said sheets,
an inlet channel defined by separate joints of said sheets and extending from said inner space of said bag to said inlet opening (26) so as to provide access from the environment to said inner space of said bag through said inlet channel,
two closure valve flaps (16,18) connected to said sheets (12,14) at said inlet opening (26) and extending from said inlet opening (26) within the interior of said bag towards said inner space of said bag along said inlet channel, said closure valve flaps (16,18) being joined together and being joined to said sheets (12,14) through said separate joints defining said inlet channel so as to provide two closure pockets being open towards said inner space of said bag,
said inlet channel comprising a first segment and a second segment, said first segment being provided adjacent to said inlet opening (26), and said second segment interconnecting said first segment and said mould compartment or mould compartments (24), said first segment tapering towards said second segment, said first segment and said second segment defining at their transition a constriction,
said inlet channel defining a first direction constituting the longitudinal direction of said inlet channel, and a second direction in a plane parallel with said two sheets perpendicular to said first direction, and
said closure valve flaps (16,18) extending from said inlet opening (26) beyond said constriction at said transition,
CHARACTERIZED by said closure valve flaps (16,18) extending from said inlet opening (26) beyond said constriction at said transition to a position at the centre of said second segment.

2. A freezing mould bag according to Claim 1, said second segment having a maximum dimension along said second direction of at least 2 times the dimension of said constriction along said second direction.

3. A freezing mould bag according to any of the Claims 1-2, said closure valve flaps (16,18) being constituted by turned-in parts of laid sheets (12,14).

4. A freezing mould bag according to any of the Claims 1-3, said closure valve flaps (16,18) extending to a position defining a distance from said constriction being at leas! 0.5 times the dimension of said constriction along said second direction, preferably 0.5-2 times the dimension of said constriction.

5. A freezing mould bag according to any of the Claims 1-4, said maximum dimension of said second segment along said second direction of said inlet channel being 2-7 times the dimension of said constriction, preferably 2.4-5 times -the dimension of said constriction, such as 2.6-3.4 times the dimension of said constriction.

6. A freezing mould bag according to any of the Claims 1-5, said first segment having a dimension along said second direction of said inlet channel at said inlet opening (26) being approximately two times the dimension of said constriction along said second direction.

7. A freezing mould bag according to any of the Claims 1-6, said first segment being defined by joints constituting straight lines or curved lines defining a first segment of a convex or concave configuration.

8. A freezing mould bag according to any of the Claims 1-7, said second segment being bounded by joints constituting partly straight lines and partly curved lines, such as segments of circles defining a second segment of a convex or concave configuration.

9. A freezing mould bag according to any of the

Claims 1-8, said inlet channel being substantially symmetrical relative to its longitudinal axis.

10. A freezing mould bag according to any of the Claims 1-9 comprising more than two mould compartments (24), preferably more than twelve mould compartments (24), such as twenty-four mould compartments (24).

11. A freezing mould bag according to Claim 10, said second segment having a size corresponding to approximately 1-2 times a single mould compartment.

12. A freezing mould bag according to any of the Claims 1-11, said sheets (12,14) constituting segments of planar foil paths or segments of foil paths provided with printings corresponding to said mould compartments.

13. A freezing mould bag according to any of the Claims 1-12, said sheets (12,14) being plastic foil sheets or aluminum foil sheets, and said joints being constituted by welded joints or glue joints.

Patentansprüche

1. Ein Gefrierformbeutel, der folgendes umfasst:

zwei dünne Bahnen (12, 14) aus einem Folienmaterial, wobei diese Bahnen eine weitgehend identische geometrische Form haben und eine äussere Peripherie bilden,

eine periphere Verbindungsnaht (20), welche sich über den grössten Teil der äusseren Peripherie dieser Bahnen erstreckt, mit Ausnahme eines peripheren Bereiches, welcher eine Einlassöffnung (26) für den Gefrierformbeutel (10) bildet, und in dem die periphere Verbindungsnaht diese beiden Bahnen in einem weitgehend überlappenden Verhältnis miteinander verbindet und einen Innenraum innerhalb des Gefrierformbeutels (10) bildet, wobei dieser Innenraum mindestens ein Formabteil (24), jedoch vorzugsweise eine Vielzahl von Formabteilen (24) bildet, welche untereinander verbunden sind und durch getrennte Verbindungsnähte (28) dieser Bahnen gebildet werden,

einen Einlasskanal, welcher durch getrennte Verbindungsnähte dieser Bahnen gebildet wird und sich aus dem Innenraum des Gefrierformbeutels zu dieser Einlassöffnung (26) erstreckt, um so durch diesen Einlasskanal einen Zugang von der Aussenseite zu dem Innenraum des Gefrierformbeutels zu bilden,

zwei Verschlussklappen (16, 18), die an diesen Bahnen (12, 14) an der Einlassöffnung (26) befestigt sind und sich von der Einlassöffnung (26) innerhalb des Innenraumes des Gefrierformbeutels in diesen Innenraum des Gefrierformbeutels entlang diesem Einlasskanal erstrecken, wobei diese Verschlussklappen (16,18) untereinander verbunden sind und an diesen Bahnen (12, 14) über die getrennten Verbindungsnähte befestigt sind, welche den Einlasskanal bilden, um so zwei Schliesstaschen zu bilden, welche gegen den Innenraum des Gefrierformbeutels offen sind,

wobei dieser Einlasskanal ein erstes Segment und ein zweites Segment aufweist, von denen das erste Segment in der Nähe der Einlassöffnung (26) angeordnet ist, während das zweite Segment das erste Segment mit dem oder den Formabteilen (24) verbindet und dieses erste Segment gegen das zweite Segment abgeschrägt ist und dieses erste und zweite Segment an ihrem Übergang eine Einschnürung bilden,

wobei dieser Einlasskanal eine erste Richtung bildet, welche die Längsrichtung dieses Einlasskanals ist, sowie eine zweite Richtung in einer Ebene, welche parallel zu diesen beiden Bahnen rechtwinklig zu der ersten Richtung verläuft, und

wobei sich diese Verschlussklappen (16, 18) von der Einlassöffnung über die Einschnürung an dem Übergang hinaus erstrecken,
dadurch gekennzeichnet, dass

sich diese Verschlussklappen (16, 18) von der Einlassöffnung (26) über die Einschnürung an dem Übergang in eine Position erstrecken, welche in etwa im Mittelpunkt des zweiten Segmentes liegt.

2. Ein Gefrierformbeutel nach Anspruch 1, dadurch gekennzeichnet, dass dieses zweite Segment in der zweiten Richtung eine maximale Abmessung hat, welche mindestens zweimal so gross ist, wie die Abmessung der Einschnürung entlang der zweiten Richtung.

3. Ein Gefrierformbeutel nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, dass die Verschlussklappen (16, 18) durch nach innen gekehrte Teile der Bahnen (12, 14) gebildet werden.

4. Ein Gefrierbeutel nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, dass sich diese Verschlussklappen (16, 18) in eine Position erstrecken,

welche in einem Abstand von der Einschnürung liegt, der mindestens 0,5 mal die Abmessung der Einschnürung entlang der zweiten Richtung hat, und vorzugsweise 0,5 til 2 mal die Abmessung dieser Einschnürung hat.

5. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass die maximale Abmessung des zweiten Segmentes in der zweiten Richtung des Einlasskanals 2 bis 7 mal die Abmessung dieser Einschnürung hat, jedoch vorzugsweise 2,4 bis 5 mal die Abmessung dieser Einschnürung hat, wie zum Beispiel 2,6 bis 3,4 mal die Abmessung dieser Einschnürung.

6. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, dass das erste Segment eine Abmessung entlang der zweiten Richtung des Einlasskanals an der Einlassöffnung (26) hat, welche in etwa auf 2 mal die Abmessung dieser Einschnürung entlang der zweiten Richtung beträgt.

7. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass das erste Segment durch Verbindungsnähte gebildet wird, welche in Form von geraden Linien oder gekrümmten Linien ausgebildet sind, und die ein erstes Segment mit einer konvexen oder konkaven Konfiguration bilden.

8. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, dass das zweite Segment von Verbindungsnähten eingegrenzt wird, welche teilweise in Form von geraden Linien und teilweise in Form von gekrümmten Linien ausgebildet sind, wie zum Beispiel in Form von Kreissegmenten, welche ein zweites Segment mit einer konvexen oder konkaven Konfiguration bilden.

9. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass dieser Einlasskanal weitgehend symmetrisch zu seiner Längsachse verläuft.

10. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, dass dieser Gefrierformbeutel mehr als zwei Formabteile (24) enthält, jedoch vorzugsweise mehr als zwölf Formabteile (24), wie zu Beispiel vierundzwanzig Formabteile (24).

11. Ein Gefrierformbeutel nach Anspruch 10, dadurch gekennzeichnet, dass das zweite Segment eine Grösse hat, welche etwa 1 bis 2 mal der Grösse eines einzigen Formabteils entspricht.

12. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, dass diese dünnen Bahnen (12, 14) Abschnitte von ebenen Folienbahnen oder Abschnitte von Folienbahnen bilden, welche mit Aufdrucken versehen sind, die diesen Formabteilen entsprechen.

13. Ein Gefrierformbeutel nach einem der Ansprüche 1 bis 12, dadurch gekennzeichnet, dass diese Bahnen (12, 14) aus Kunststoffolien oder Aluminiumfolien hergestellt sind und dass diese Verbindungsnähte geschweisste Verbindungen oder geklebte Verbindungen sind.

Revendications

1. Poche de moulage pour la congélation comprenant:

deux feuilles (12, 14) d'un matériau en feuille, lesdites feuilles étant d'une forme géometrique substantiellement identique et définissant un contour extérieur,
un joint périphérique (20) s'étendant sur la plus grande partie dudit contour extérieur desdites feuilles, à l'exception d'une aire périphérique constituant une ouverture d'entrée (26) de ladite poche (10), ledit joint peripherique réunissant lesdites feuilles en une relation globale de recouvrement et définissant un espace intérieur à l'intérieur de ladite poche (10), ledit espace intérieur constituant au moins un compartiment (24) de moulage et de préférence une pluralité de compartiments (24) de moulage interconnectés et définis par des joints (28) desdites feuilles séparés les une des autres,
une goulotte d'entrée définie par des joints séparés desdites feuilles et s'étendant entre ledit espace intérieur de ladite poche et ladite ouverture d'entrée (26) afin de fournir un accès entre le milieu environnant et ledit espace intérieur de ladite poche par l'intermédiaire de ladite goulotte d'entrée,
deux rabats (16, 18) d'obturation reliés auxdites feuilles (12, 14) au niveau de ladite ouverture d'entrée (26) et s'étendant de ladite ouverture d'entrée (26) à l'intérieur de ladite poche vers ledit espace intérieur de ladite poche le long de ladite goulotte d'entrée, lesdits rabat (16, 18) d'obturation étant joints entre eux et étant joints auxdites feuilles (12, 14) par l'intermédiaire desdits joints séparés définissant ladite goulotte de manière à ménager deux poches de fermeture qui s'ouvrent vers ledit espace intérieur de ladite poche,
ladite goulotte d'entrée comprenant un premier segment et un second segment, ledit premier segment étant adjacent à ladite ouverture d'entrée (26) et ledit second segment intercon-

nectant ledit premier segment et ledit compartiment de moulage ou lesdits compartiments de moulage (24), ledit premier segment allant en diminuant vers ledit second segment, ledit premier segment et ledit second segment définissant un étranglement situé à leur jonction,

ladite goulotte d'entrée définissant une première direction constituant la direction longitudinale de ladite goulotte d'entrée et, dans un plan parallèle aux deux dites feuilles, une seconde direction perpendiculaire à ladite première direction, et

lesdits rabat (16, 18) d'obturation s'étendant de ladite ouverture d'entrée (26) au-delà dudit étranglement situé à ladite jonction,

caractérisé par le fait que lesdits rabats (16, 18) d'obturation s'étendant de ladite ouverture d'entrée (26) au-delà dudit étranglement situé à ladite jonction jusqu'à une position située approximativement au centre dudit second segment.

2. Poche de moulage pour la gongélation selon la Revendication 1, ledit second segment possédant le long de ladite seconde direction une dimension maximale d'au moins deux fois la dimension dudit étranglement le long de ladite seconde direction.

3. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 2, lesdits rabats (16, 18) d'obturation étant constitués par des parties repliées vers l'intérieur desdites feuilles (12, 14).

4. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 3, lesdits rabats (16, 18) d'obturation s'étendant jusqu'à une position définissant une distance à partir dudit étranglement égale à au moins 0,5 fois la dimension dudit étranglement le long de ladite seconde direction, et de preference 0,5 à 2 fois la dimension dudit étranglement.

5. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 4, ladite dimension maximale dudit second segment le long de ladite seconde direction de ladite goulotte d'entrée étant 2 à 7 fois la dimension dudit étranglement, et de préférence de 2,4 à 5 fois la dimension dudit étranglement, par exemple de 2,6 à 3,4 fois la dimension dudit étranglement.

6. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 5, ledit premier segment ayant une dimension le long de ladite seconde direction de ladite goulotte d'entrée au niveau de ladite ouverture d'entrée (26) d'approximativement deux fois la dimension dudit étranglement le long de ladite seconde direction.

7. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 6, ledit premier segment étant défini par des joints constituant des lignes droites ou des lignes courbes définissant un premier segment de configuration convexe ou concave.

8. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 7, ledit second segment étant limité par des joints constituant des lignes partiellement droites et des lignes partiellement courbes, telles que des segments de cercle, définissant un second segment de configuration convexe ou concave.

9. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 8, ladite goulotte d'entrée étant substantiellement symétrique par rapport à son axe longitudinal.

10. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 9, comprenant plus de deux compartiments (24) de moulage, et de préférence plus de douze compartiments (24) de moulage, par exemple ving-quatre compartiments (24) de moulage.

11. Poche de moulage pour la congélation selon la Revendication 10, ledit second segment ayant une taille correspondant à approximativement 1 à 2 fois un compartiment individuel de moulage.

12. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 11, lesdites feuilles (12, 14) constituant des segments de chemins de feuilles planes ou des segments de chemins de feuilles munis d'empreintes correspondant auxdites compartiments de moulage.

13. Poche de moulage pour la congélation selon l'une quelconque des Revendications 1 et 12, lesdites feuilles (12, 14) étant de minces feuilles de matière plastique ou de minces feuilles d'aluminium, et ledits joints étant constitués par des joints soudés ou par des joints collés.

Fig. 1

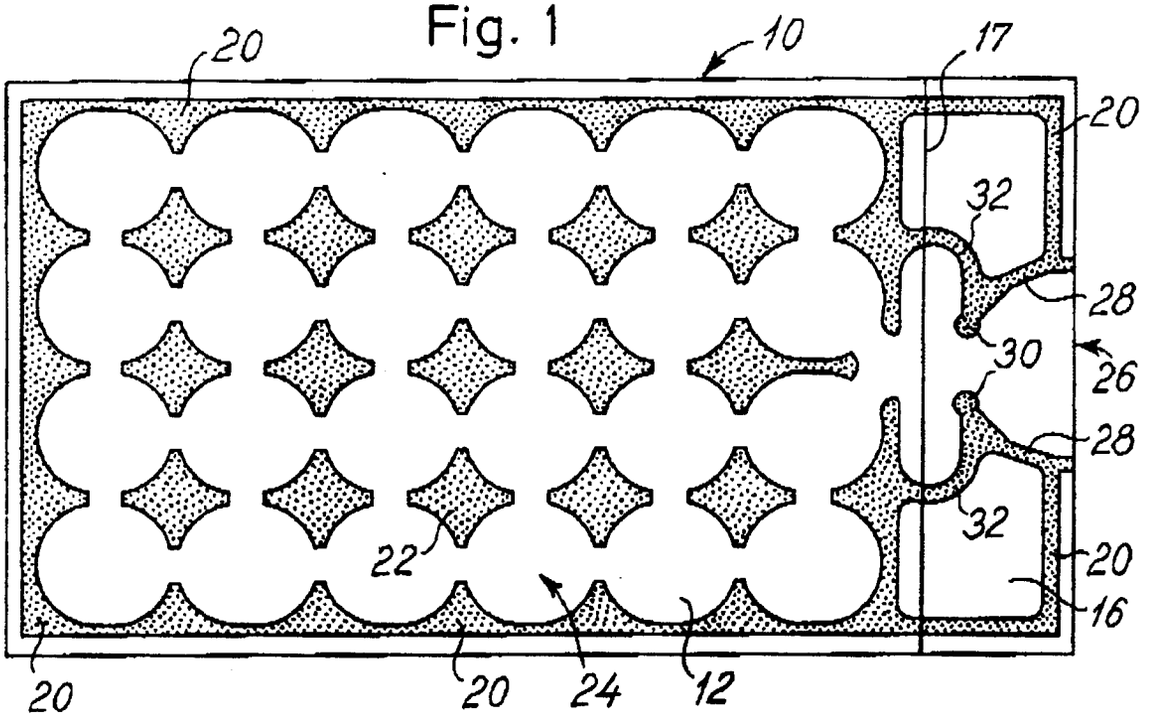


Fig. 2

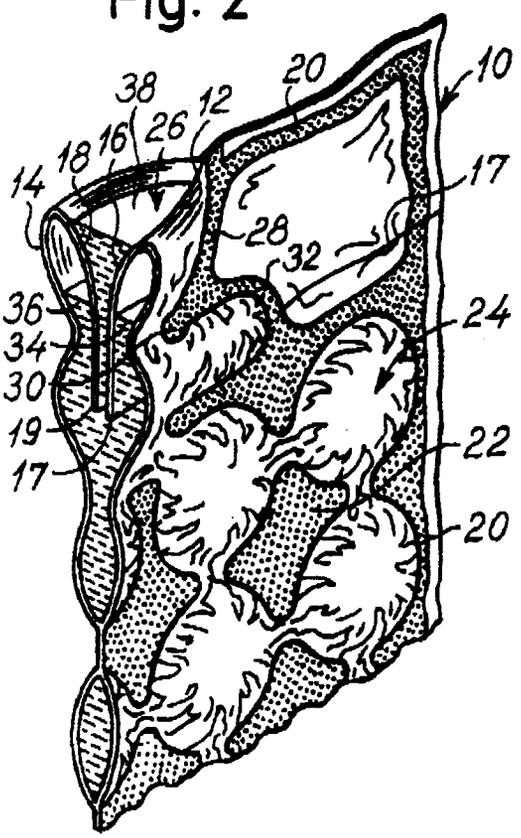
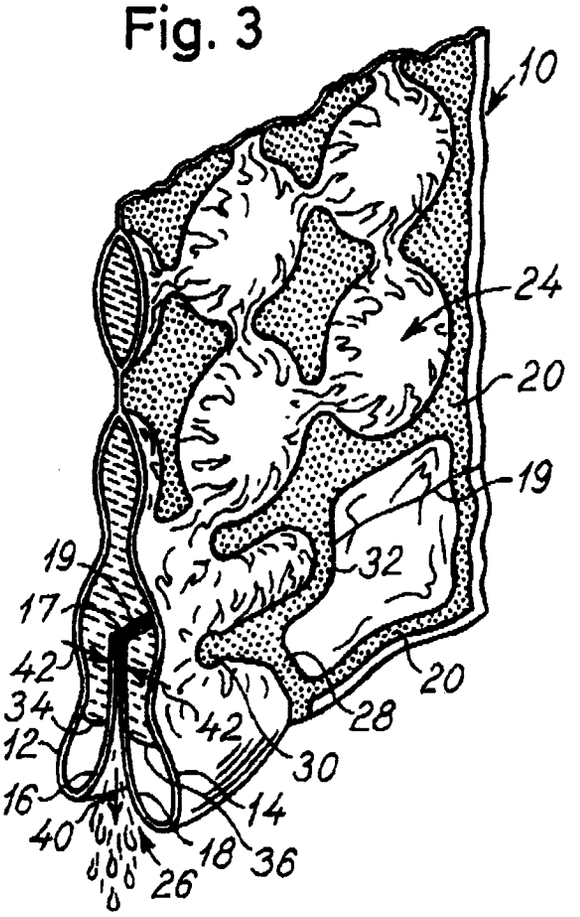


Fig. 3



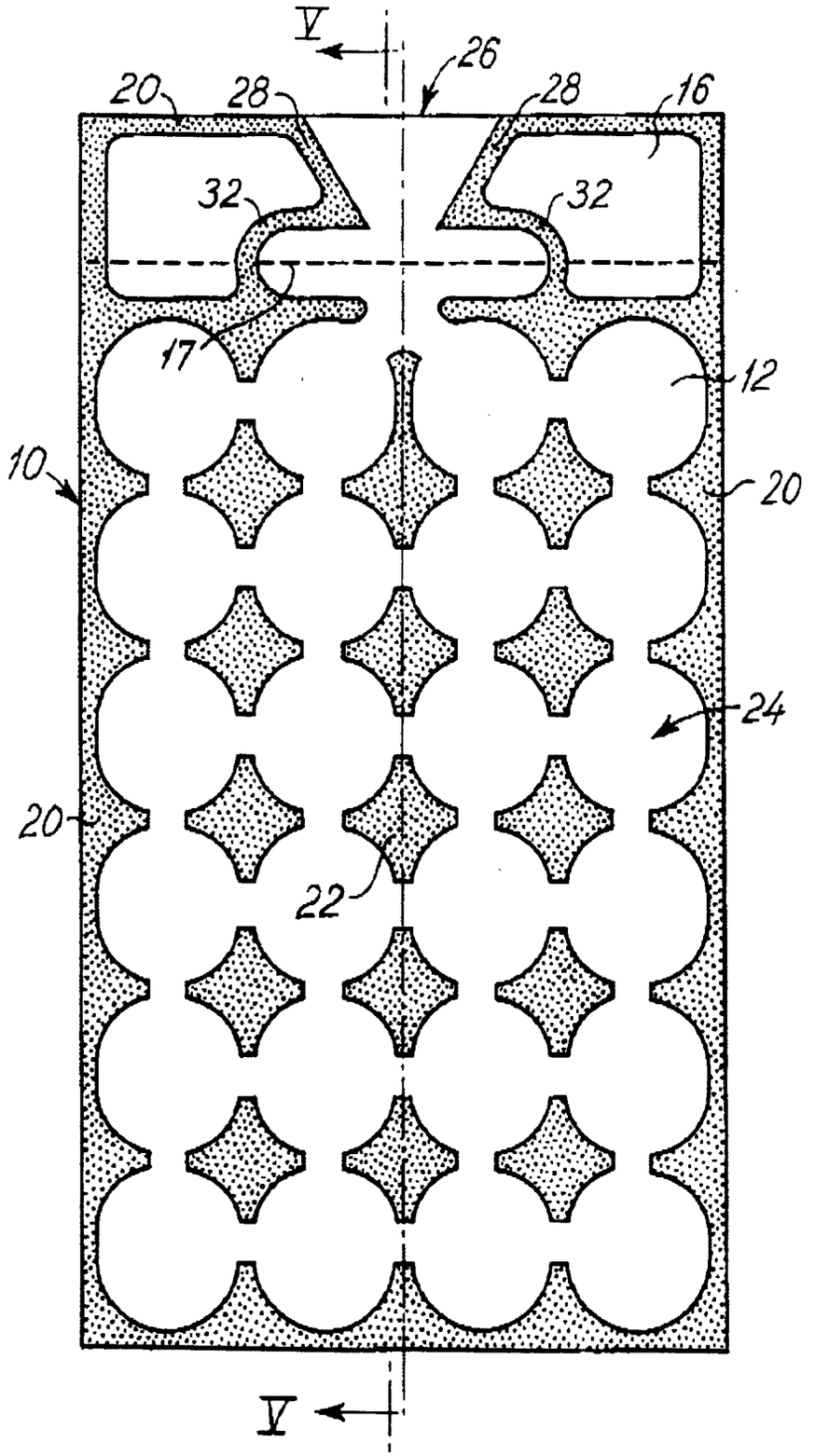

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Fig. 4

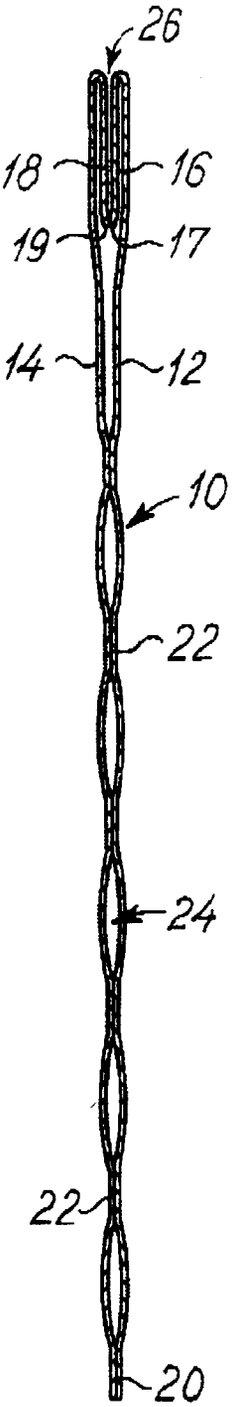
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Fig. 5