

PATENT SPECIFICATION

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(54) MOULD BAG FOR FORMING ICE-PIECES

(71) I, ERLING VANGEDAL-NIELSEN, of 67 Kirke Vaerløsevej, DK 3500 Vaerløse, Denmark, of Danish nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to a disposable mould bag for receiving and retaining therein liquid to be frozen into a plurality of ice pieces, and to a method of making individual ice pieces using such a mould bag.

Heretofore so-called ice cubes have been prepared in relatively shallow and partitioned trays which are filled with liquid and placed in a freezer, e.g. the freezer compartment of a refrigerator. Such open mould trays have to be disposed horizontally in the freezer in order to avoid spillage of liquid from the trays. Accordingly, the number of trays, which may be disposed in a freezer, is limited and, thereby the number of ice tubes which may be prepared at one time is restricted.

According to the present invention in one aspect there is provided a disposable mould bag for receiving and retaining therein liquid to be frozen into a plurality of ice pieces, said mould bag comprising two opposed sheets of flexible plastics material defining the walls of the mould bag and at least one filling opening for admitting into the bag liquid to be retained therein to be frozen, said opposed sheets being joined together at a plurality of positions spaced over selected portions of the sheets so as to form a plurality of compartments defined by said opposed sheets and the joints therebetween, at least one of said compartments communicating with said filling opening, said plurality of compartments being arranged to define at least one series of consecutive compartments interconnected by passages in said joints, and together defining a flow path extending from said one compartment, to a last or terminal compartment, whereby liquid introduced through said filling opening flows to said one compartment and on to said last or terminal

compartment of each series, thereby successively filling all compartments with liquid to be frozen, the liquid rising from the lowermost bag portion, the walls of each compartment as defined by said opposed sheets, being generally flat and lying in contact with one another prior to said compartments being filled with liquid, said walls being sufficiently flexible to enable liquid retained in each compartment to distend said walls to a bulged condition which defines the shape of the objects to be frozen, said interconnections between adjacent compartments having a reduced cross-section so as to render the frozen mass formed therein readily breakable, and the thickness of said walls being such that the frozen pieces formed in the compartments may be individually and selectively released from the bag by rupturing said walls.

According to the present invention in another aspect there is provided a method of making individual ice pieces using a mould bag as defined above, said method comprising introducing liquid to be frozen into the filling passage of the disposable mould bag so that the compartments are filled with liquid; closing off the filling passage to retain liquid to be frozen in the mould bag; freezing the mould bag and retained liquid to thereby form individual ice pieces from the liquid; and progressively destroying the mould bag to gain access to the individual ice pieces.

When filling the mould bag according to the invention with liquid, the filling opening of the bag may e.g. be placed around water cock or tap. The liquid may flow from compartment to compartment which are filled and distended successively. Since the empty mould bag may be completely flat, the amount of air which has to escape from the interior of the bag during the filling thereof, will be limited. In most cases it is not necessary to take specific measures in order to make sure that air may escape from the bag during the filling thereof, but if desired there may be provided e.g. two filling openings, only one opening being used for filling of liquid while air may escape through the

other opening.

After being filled with liquid, the mould bag according to the invention may be closed off in a liquid-proof manner, and a number of filled bags may thereafter be disposed or stacked in a freezer without considering the orientation of the bags. However, the filled mould bags may also be suspended on hangers or racks in a freezer and several bags filled with liquid can be suspended hanging freely from the same hanger in this manner without necessarily having the filling openings of the bags closed off in a completely liquid-proof manner.

The frozen ice pieces may easily be removed by tearing the mould bag. In that connection, it is a particular advantage of the bag according to the invention that the ice pieces may be removed individually and, accordingly, it is possible to remove a desired number of ice pieces whereafter the mould bag with remaining ice pieces may be disposed in the freezer again for later use.

Due to the structure of the mould bag, it is possible to prepare ice pieces having several various shapes. However, the ice pieces will get a biconvex cross-section, and pillow- or lense-like shapes would, therefore, be preferred. However, various figures such as fishes or animals or the like may also be prepared.

Some embodiments of the invention will now be described, by way of examples, with reference to the accompanying drawings, in which:-

Figure 1 shows a strip of mould bags in accordance with a first embodiment of the invention;

Figure 2 is a sectional view taken along line II-II indicated in Figure 1, but showing the condition after filling of the bag with liquid;

Figure 3 is a sectional view taken along the line III-III indicated in Figure 1, but showing the condition after filling the bag with liquid;

Figures 4a to 4e are schematic illustrations of various alternative possibilities of defining mould compartments in a mould bag according to the invention;

Figure 5 shows a further embodiment of a mould bag according to the invention;

Figure 6 shows still another embodiment of a mould bag according to the invention;

Figure 7 is a side view schematically illustrating how closure flaps may be provided in mould bags according to the invention by folding the bag walls; and

Figure 8 is a partial plan view showing a mould bag according to the invention provided with closure flaps in accordance with Figure 7.

Referring now to the drawings, Figure 1 shows a strip 1 including a plurality of mould bags 2 made of thin plastics sheet

material, the bags 2 being connected at tear-off lines 3 so that the bags 2 may be separated from each other in the same manner as known in connection with plastics bags for domestic or similar uses. The two opposed sides or walls of each bag 2 are joined at certain areas which are indicated by hatchings in Figure 1, and thereby are defined several compartments between the two sides or bag walls. In the embodiment of Figure 1, the compartments include two funnel shaped openings 4 and 5, the confronting edges thereof defining a slit 6 extending from a location adjacent to the narrowest portion of the openings 4 and 5 and all the way out to the tear-off line 3 or even beyond that line.

The funnels 4 and 5 communicate at their narrowest ends with respective first mould compartments 7' being a part of respective rows of compartments 7 which communicate with each other through short connection channels 8. In the embodiment of Figure 1, there is only one connection channel 8 between successive mould compartments 7' and, accordingly, there is only one flow path from one funnel, through the mould compartments and then to the other funnel. However, additional transverse connection channels or openings may be provided, if necessary or desired. Near to the level of the narrowest portions of the two funnels 4 and 5 there may be provided two pairs of holes 9, 10, which may be used for suspending a mould bag 2 on a hanger or the like after the bag 2 has been folded along a folding line indicated at 11 in Figure 1.

When a mould bag 2 is to be used for freezing ice pieces, a bag 2 is separated from the strip 1. Thereafter, the bag 2 is filled with liquid, e.g. by inserting one of the two funnels 4, 5 over an ordinary water cock or tap which is then opened for a sufficiently long time to fill the compartments 7' of the bag 2 with water. Any air present in the interior of the bag 2 will be expelled through the other funnel by the inflowing water. The filling is continued until all compartments 7' have been filled and the water will cause the mould compartments 7' and the connection channels 8 to bulge as shown in Figures 2 and 3.

If the filled mould bag 2 is to be disposed horizontally during the freezing of the water in the compartments 7', the filling end of the bag 2 including the funnels 4 and 5 is closed off, e.g. by twisting the funnels 4 and 5 together and by closing them by means of an appropriate clamp or a wire. Alternatively, the bag 2 may be closed off simply by tying the two funnels 4 and 5 together in one or more knots.

If, on the other hand, the filled mould bag 2 is to be disposed in e.g. a deep-freezer in which space is available to suspend the bag

in a vertical position, then the filling end of the bag 2 may be folded about the folding line 11 between the two pairs of holes 9, 10 so that the holes 9 are aligned with the respective holes 10, whereafter the bag 2 may be suspended on a hanger or on other suitable suspending means (not shown).

When the frozen ice pieces are to be used, the mould bag 2 is removed from the freezer and the ice pieces are released from the bag 2 by squeezing them out through the thin plastics sheet material. The ice pieces may be released, beginning from one end of the bag 2 and when a desired number of ice pieces has been released, the bag 2 and remaining ice pieces therein may thereafter be re-placed in the freezer again. The ice pieces will be connected to each other by thin ice bridges formed in or by the connection channels 8, but such ice bridges may easily be broken, when releasing the ice pieces. When the mould bag 2 has been emptied, it is disposed of as it cannot be reused due to the tearing of the plastics sheet material. Since the plastics sheet material may be very thin, the disposed bag does not represent any substantial waste of material.

In order to be able to clearly see any pieces of plastics sheet material which may stick to the released ice pieces and which have to be removed, the plastics sheet material may be suitably coloured.

Figures 4a to 4e show various alternative possibilities of designing the portion of the bag 2 in which the mould compartments 7 and the connection channels 8 are located. In the embodiment shown in Figure 4b there is, as will appear, no specific arrangements to have air expelled from the interior of the bag since this embodiment is based on the fact that the bag may be flat before the filling thereof and, accordingly, it does not contain any substantial amount of air.

In the embodiment illustrated in Figure 4e, the sealing lines which define the mould compartments 7 are wave-shaped, resulting in the ice pieces being provided with serrated edges which facilitate the rupturing of the sheet material during the release of ice pieces and which also have a decorative effect on the ice pieces prepared.

The embodiments illustrated in Figures 4a to 4e should only be considered as examples, since many other shapes of the mould compartments 7 and the boundary surfaces or sides thereof may be contemplated. Thus, e.g. the square pattern of Figure 4e with wave edges may be replaced by a honeycomb like pattern with or without wave edges. The mould compartments 7 may also be shaped in order to provide ice pieces of a particular shape such as e.g. fishes or other animals.

In order to facilitate the removal or

release of the ice pieces, the mould bag 2 may be held under a water cock or tap so that the outer layer of the ice melts, whereby the ice pieces are detached from the plastics sheet material.

It is not necessary to have two funnels as in Figure 1, since as mentioned in connection with Figure 4b above, the air may be expelled from the interior of the bag by having the bag flat before filling.

Figure 5 shows a further embodiment of the freezing mould bag according to the invention. In this embodiment, the two sheets of the bag are joined together to provide substantially circular mould compartments 7 arranged in rows. Each compartment 7 communicates with adjacent compartments, the circular boundary of each compartment 7 overlapping the corresponding boundaries of the respective adjacent compartments 7 to some extent. The joined or sealed areas are indicated by hatchings in Figure 5.

In the embodiment according to Figure 5, the filling opening of the bag is designed as a funnel shaped conduit 20 defined by sealings between the two sheets of the bag. The funnel shaped conduit 20 communicates with a first mould compartment 7' from which liquid can flow on to all subsequent or further mould compartments.

Also this embodiment of bag may be closed off after filling with liquid either by tying a knot on that bag portion including the funnel 20 or by means of a suitable clamp or corresponding means which is disposed on or around the funnel 20 to close it. The mould bag shown may also have an opening 21 whereby the bag may be suspended in the filled condition and in that case it is not strictly necessary to close the filling conduit 20.

Figure 6 shows yet another embodiment of a mould bag according to the invention in which the mould compartments 7 are defined by linear joints contrary to the embodiment according to Figure 5 in which the compartments 7 are defined by joined or sealed areas.

In Figure 6, the filling opening is also designed as a funnel shaped inlet conduit 22 communicating with a first mould compartment 7' which, in turn, communicates with the other mould compartments 7. However, the inlet conduit 22 is not provided in a neck shaped portion of the bag as in Figure 5. The mould bag is instead generally rectangular in shape and in the area immediately above the upper mould compartments 7 there are provided two slots 23 extending from respective side edges of the bag and to a point immediately outside of the sealings defining the inlet conduit 22.

With this arrangement of the top or filling end of the mould bag, a particular closing

technique may be used after the bag has been filled with liquid. The bag portions outside of the slots 23 may be folded (downwardly in Figure 6) one or several times along transverse folding lines and thereafter the two wings thus provided may be moved toward each other, whereafter they may be tied together in a knot so that the inlet conduit 22 will be closed.

10 The arrangement shown in Figure 6 as to the top of the mould bag is, moreover, advantageous in that no waste in the shape of severed sheet material will occur as will be the case when preparing a mould bag as that of Figure 5.

15 In the embodiment according to Figure 5, the mould compartments may also be defined by linear joints in a similar manner as in Figure 6 and the embodiment according to Figure 5 may also be provided with a top or inlet end similar to that of Figure 6.

20 As mentioned above, the various embodiments of the freezing mould bag according to the invention may be particularly adapted for closing after filling with liquid, or they may be adapted to be suspended in the filled condition.

25 However, if desired the various embodiments may also be provided with valve means of the check valve type which, when the bag has been filled with liquid, prevents that liquid flowing back or out through the filling opening. Such valve means may e.g. be a suitable lip or duckbill valve appropriately inserted e.g. as indicated schematically and with dotted lines at 24 in Figure 5.

30 However, the valve means may also simply consist of at least one suitably flexible and movable closing flap inserted and attached between the walls of the bag.

35 A closing flap arrangement may also be provided by means of the bag walls. As indicated in Figure 7, the upper part of the two walls of the bag may be folded backwardly and inwardly to provide two flaps 25. These flaps may, as shown in Figure 8, form a closing arrangement in a transverse conduit 26 which, moreover, may serve as a liquid distributing conduit. Flaps with similar functions may also be provided by inserting separate sheets between the two walls of the bag.

40 In the embodiments described above, the filling openings are shaped as one or more funnel shaped inlet conduits which is advantageous during the filling of the bags with liquid. Such a funnel shaped inlet is, however, not strictly necessary since e.g. the respective first or first lying mould compartments 7' may serve as inlet chambers. Just to illustrate that, the neck shaped inlet of the embodiment according to Figure 5 could be completely omitted and a water cock or tap or similar device could then be inserted in the compartment 7' when filling

the bag with liquid. After the filling, the opening could then be closed in a suitable manner e.g. by means of a transverse heat sealing.

70 The various mould compartments of the freezing mould bag according to the invention may be defined, shaped and connected in several ways as long as all compartments may be filled with liquid from the filling opening of the bag. However, in order to have a proper liquid distribution it is preferred that each mould compartment communicates with all surrounding or adjacent compartments, e.g. as in the embodiments of Figures 5 and 6.

80 The compartment defining joints in the mould bag according to the invention may be sealed areas e.g. as in Figure 1 or in Figure 5. However, as to manufacture, it may be advantageous that the joints are linear, e.g. as in Figures 4a-4e or as in Figure 6.

The joints or sealings may be provided as heat sealings, including high frequency weldings or by means of suitable adhesives.

90 Mould bags according to the invention are preferably made of relatively thin plastics sheet material. Examples of suitable materials are polyethylene, polypropylene or polyvinyl-chloride.

95 The mould bags according to the invention may be prepared and marketed in strips of interconnected bags of the type shown in Figure 1, but the bags may also be prepared individually and be marketed e.g. in bundles which may be inserted on a hanger or similar means by holes and the hanger may go with the mould bags for use in a deep freezer or other freezing compartment permitting vertical suspension of the bags.

105 Mould bags according to the invention may also be used to market prefrozen ice pieces including batches of ice cream and ice with various additives and in such cases the mould bags with their contents may be disposed in freezing cabinets in the shops.

110 Finally, mould bags according to the invention are well-suited for marketing and distribution of freezable liquids and in such cases the mould bags are prefilled with liquid and sealed on the manufacturing site. Alternatively, the mould bags may be sold together with a container with the liquid for freezing, and the consumers may then fill and freeze the mould bags with liquid from such a container.

WHAT I CLAIM IS:-

1. A disposable mould bag for receiving and retaining therein liquid to be frozen into a plurality of ice pieces, said mould bag comprising two opposed sheets of flexible plastics material defining the walls of the mould bag and at least one filling opening for admitting into the bag liquid to be retained therein to be frozen, said opposed sheets being joined together at a plurality of

technique may be used after the bag has been filled with liquid. The bag portions outside of the slots 23 may be folded (downwardly in Figure 6) one or several times along transverse folding lines and thereafter the two wings thus provided may be moved toward each other, whereafter they may be tied together in a knot so that the inlet conduit 22 will be closed.

The arrangement shown in Figure 6 as to the top of the mould bag is, moreover, advantageous in that no waste in the shape of severed sheet material will occur as will be the case when preparing a mould bag as that of Figure 5.

In the embodiment according to Figure 5, the mould compartments may also be defined by linear joints in a similar manner as in Figure 6 and the embodiment according to Figure 5 may also be provided with a top or inlet end similar to that of Figure 6.

As mentioned above, the various embodiments of the freezing mould bag according to the invention may be particularly adapted for closing after filling with liquid, or they may be adapted to be suspended in the filled condition.

However, if desired the various embodiments may also be provided with valve means of the check valve type which, when the bag has been filled with liquid, prevents that liquid flowing back or out through the filling opening. Such valve means may e.g. be a suitable lip or duckbill valve appropriately inserted e.g. as indicated schematically and with dotted lines at 24 in Figure 5.

However, the valve means may also simply consist of at least one suitably flexible and movable closing flap inserted and attached between the walls of the bag.

A closing flap arrangement may also be provided by means of the bag walls. As indicated in Figure 7, the upper part of the two walls of the bag may be folded backwardly and inwardly to provide two flaps 25. These flaps may, as shown in Figure 8, form a closing arrangement in a transverse conduit 26 which, moreover, may serve as a liquid distributing conduit. Flaps with similar functions may also be provided by inserting separate sheets between the two walls of the bag.

In the embodiments described above, the filling openings are shaped as one or more funnel shaped inlet conduits which is advantageous during the filling of the bags with liquid. Such a funnel shaped inlet is, however, not strictly necessary since e.g. the respective first or first lying mould compartments 7' may serve as inlet chambers. Just to illustrate that, the neck shaped inlet of the embodiment according to Figure 5 could be completely omitted and a water cock or tap or similar device could then be inserted in the compartment 7' when filling

the bag with liquid. After the filling, the opening could then be closed in a suitable manner e.g. by means of a transverse heat sealing.

The various mould compartments of the freezing mould bag according to the invention may be defined, shaped and connected in several ways as long as all compartments may be filled with liquid from the filling opening of the bag. However, in order to have a proper liquid distribution it is preferred that each mould compartment communicates with all surrounding or adjacent compartments, e.g. as in the embodiments of Figures 5 and 6.

The compartment defining joints in the mould bag according to the invention may be sealed areas e.g. as in Figure 1 or in Figure 5. However, as to manufacture, it may be advantageous that the joints are linear, e.g. as in Figures 4a-4e or as in Figure 6.

The joints or sealings may be provided as heat sealings, including high frequency weldings or by means of suitable adhesives.

Mould bags according to the invention are preferably made of relatively thin plastics sheet material. Examples of suitable materials are polyethylene, polypropylene or polyvinyl-chloride.

The mould bags according to the invention may be prepared and marketed in strips of interconnected bags of the type shown in Figure 1, but the bags may also be prepared individually and be marketed e.g. in bundles which may be inserted on a hanger or similar means by holes and the hanger may go with the mould bags for use in a deep freezer or other freezing compartment permitting vertical suspension of the bags.

Mould bags according to the invention may also be used to market prefrozen ice pieces including batches of ice cream and ice with various additives and in such cases the mould bags with their contents may be disposed in freezing cabinets in the shops.

Finally, mould bags according to the invention are well-suited for marketing and distribution of freezable liquids and in such cases the mould bags are prefilled with liquid and sealed on the manufacturing site. Alternatively, the mould bags may be sold together with a container with the liquid for freezing, and the consumers may then fill and freeze the mould bags with liquid from such a container.

WHAT I CLAIM IS:-

1. A disposable mould bag for receiving and retaining therein liquid to be frozen into a plurality of ice pieces, said mould bag comprising two opposed sheets of flexible plastics material defining the walls of the mould bag and at least one filling opening for admitting into the bag liquid to be retained therein to be frozen, said opposed sheets being joined together at a plurality of





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positions spaced over selected portions of the sheets so as to form a plurality of compartments defined by said opposed sheets and the joints therebetween, at least one of said compartments communicating with said filling opening, said plurality of compartments being arranged to define at least one series of consecutive compartments interconnected by passages in said joints, and together defining a flow path extending from said one compartment, to a last or terminal compartment, whereby liquid introduced through said filling opening flows to said one compartment and on to said last or terminal compartment of each series, thereby successively filling all compartments with liquid to be frozen, the liquid rising from the lowermost bag portion, the walls of each compartment as defined by said opposed sheets, being generally flat and lying in contact with one another prior to said compartments being filled with liquid, said walls being sufficiently flexible to enable liquid retained in each compartment to distend said walls to a bulged condition which defines the shape of the objects to be frozen, said interconnections between adjacent compartments having a reduced cross-section so as to render the frozen mass formed therein readily breakable, and the thickness of said walls being such that the frozen pieces formed in the compartments may be individually and selectively released from the bag by rupturing said walls.

2. A disposable mould bag as claimed in claim 1, in which said filling opening includes closure means to thereby retain liquid in said mould bag.

3. A disposable mould bag as claimed in claim 2, in which said closure means comprises first and second wings defined by said two opposed sheets, located on respective sides of said filling opening and extending outwardly therefrom toward opposite side edges of the sheets, said wings being sized and shaped so as to enable them to be tied together to close the filling opening once the bag is filled with liquid to be frozen.

4. A disposable mould bag as claimed in claim 3, in which said first and second wings are generally rectangular.

5. A disposable mould bag as claimed in claim 2, in which said closure means is formed by the sheet material defining the filling opening being operative to be tied into a knot to close the filling opening once the bag is filled with liquid to be frozen.

6. A disposable mould bag as claimed in any of claims 2 to 5, in which said closure means comprises valve means for preventing liquid from flowing back and out through said filling passage.

7. A disposable mould bag as claimed in claim 6, in which said valve means include at

least one movable closure flap.

8. A disposable mould bag as claimed in claim 7, in which said closure flap is a folded portion of at least one of said two opposed sheets.

9. A disposable mould bag as claimed in any of claims 1 to 8, in which only said one compartment is in fluid communication with said filling opening, and wherein each of said compartments is in fluid communication with all adjacent compartments.

10. A disposable mould bag as claimed in claim 9, in which said compartments are arranged in several series defining a regular pattern of rows and/or columns.

11. A disposable mould bag as claimed in claim 9 or claim 10, in which the compartments are of a generally circular shape being so arranged that the circles defining adjacent compartments overlap, the passages of reduced cross-sectional area between interconnected compartments being defined by said overlapping areas.

12. A disposable mould bag as claimed in claim 10, in which the compartments are of a generally elongate shape, each compartment being arranged to extend in transverse direction of the bag.

13. A disposable mould bag as claimed in any of claims 1 to 12, in which said filling opening is a funnel shaped conduit extending upwardly from the first compartment.

14. A disposable mould bag as claimed in any of claims 1 to 13, in which said compartment defining joints are provided as a pattern of heat sealed areas.

15. A method of making individual ice pieces using a disposable mould bag as claimed in any of the preceding claims, said method comprising introducing liquid to be frozen into the filling passage of the disposable mould bag so that the compartments are filled with liquid; closing off the filling passage to retain liquid to be frozen in the mould bag; freezing the mould bag and retained liquid to thereby form individual ice pieces from the liquid; and progressively destroying the mould bag to gain access to the individual ice pieces.

16. A method as claimed in claim 15, further comprising flattening the mould bag to expel air therefrom prior to introducing liquid into the filling channel.

17. A method as claimed in claim 15 or claim 16, in which liquid is introduced into the mould bag by placing an opening of the filling passage around a water cock.

18. A method as claimed in any of claims 15 to 17, in which the filling passage is closed off by folding and knotting the material forming the filling passage.

19. A mould bag substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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20. A method of making individual ice pieces substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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