

Description

This invention relates to an apparatus and its use in a method for producing ice sculpture and in particular relates to an ice mould assembly and its use in order to produce clear ice sculpture by moulding.

5 In the restaurant and hotel trade, it has been the mark of the higher quality establishments to be able to provide ice sculptures as the centerpiece of a set table. The exclusivity of ice sculpture has revolved around the fact that such centerpieces have had to be carved from solid ice by skilled artisans.

In order to reduce the high cost associated with the labour of such skilled artisans, attempts have been made to produce ice sculpture by freezing water in moulds. To this end, solid moulds of steel and
10 aluminum have been employed, with less than satisfactory results.

Firstly, by the nature of production of ice from water, rigid moulds are unsatisfactory since they do not allow for the expansion of the ice upon freezing, a characteristic of water in its phase change from liquid to solid. Where a shape to be moulded has narrow and/or protuberant portions, such moulds have tended towards stress cracking and resultant breakage at the narrow or protuberant portions.

15 Several attempts have been made to overcome such problems, with limited success being attained to date. One approach has been directed to allowing for the expansion of ice by incorporating a large base area in an inverted rigid mould. However this was found not to completely eliminate the inherent problems outlined above.

Another approach to moulding ice has been through the use of flexible moulds which are resilient
20 enough to provide for the expansion of the ice. For example, WO-A-8701183 discloses multiple bag like moulds for ice blocks. Whilst this construction is suitable for small simple objects, it is unsuitable for massive objects such as centerpiece ice sculpture since the weight of the liquid water tends to deform the flexible mould and results in loss of detail for the ice sculpture.

US-A-4206899 describes a flexible mould supported within a rectangular box. The flexible mould
25 described has a wall of sufficient wall thickness to prevent the abovementioned distortion. However the thick-walled mould is particularly difficult to peel off the frozen sculpture, apart from being expensive. In particular, this construction of mould results in ice sculpture containing cracks which are caused by stress concentration. These cracks, as have been found in substantially all of the moulds previously proposed, detract from the appearance of the sculpture as well as promoting a tendency to structural weakness at
30 protuberant or narrow sections of the ice sculpture.

US-A-3684234 describes an expandable form for supporting a pliable container, the combination comprising an open topped mould for ice. The form is constructed and arranged to allow outward flexing to permit expansion of the ice and to assist in demoulding. A removable cover is provided which retains the container and permits stacking of the forms. The air space at the top of the assembly provides insulation for
35 the top of the water, preventing this region of the water from freezing first and "locking in" the underlying water. However, ice sculpture produced with this apparatus still has the deficiency of cracks at narrow or protuberant parts with resultant poor appearance and structural strength.

US-A-4669271 extends the principles of US-A-3684234 and describes an apparatus comprising two contoured sidewalls releasably joined at flat peripheral flanges to define an enclosure having a top opening
40 bordered by a horizontal rim. A thin flexible envelope, contoured to conform with the interior of the enclosure is inserted into the enclosure in a manner such that the mouth opening of the envelope is draped across the rim. The insulated cover again prevents the top surface of the water from freezing first, resulting in ice mouldings of improved clarity. Demoulding is facilitated by removing the cover, separating the sidewalls and preferably peeling the envelope off the ice sculpture.

45 The description of US-A-4669271 further states that the mould is preferably constructed of fiberglass reinforced plastic material by spraying a fast-setting catalyzed resin and fiberglass mixture onto a form coated with release agent. The fiberglass incorporates the design to be moulded as a negative impression.

The contoured, thin flexible water-impermeable envelope is fabricated by applying repeated coatings of an elastomeric material such as latex upon an object, and then peeling the cured, integral envelope from
50 the object. Where the object is irregular in that portions protrude relative to the bulk, the envelope is pleated to enable expansion of the envelope to facilitate peeling from the frozen sculpture.

The thermally insulative cover is of uniform thickness with a flat lower surface, and completely covers the horizontal rim and opening. The cover is preferably of wood or closed cell foam. The cover is preferably weighted to provide a firm seal against the mouth of the envelope.

55 Although this mould construction represents a significant improvement over the prior art, there remains a significant deficiency inherent in the construction, that is, where the sculpture has narrow or protuberant parts, these tend to accumulate stresses on freezing of the water, resulting in cloudiness and/or cracking. Whilst the ice mould of US-A-4669271 provides clear ice in the bulk of the sculpture, it retains this

deficiency in common with the prior art.

US-A-2939299 describes a mould assembly including complementary mould members defining an open topped mould cavity and including insulating chambers adapted to effectively prevent premature freezing of narrow portions of the sculpture. The apparatus is directed to at least partially overcoming accumulation of freezing stresses at such narrow portions but does not address the problem of maintaining clear ice through the structure and, in particular, does not address the problem of stress development at protuberant portions of the sculpture.

It is thus an object of the present invention to provide an apparatus for the production of ice sculpture by moulding, which apparatus substantially eliminates stress concentration and cracking at narrow or protuberant regions of the sculpture and thereby substantially overcomes the deficiencies of the prior art.

As used hereinafter the term "narrow" or "narrow portion" is to be taken to mean a portion of the ice sculpture having a cross sectional dimension that is relatively narrow or reduced dimensions compared to adjacent parts of the ice sculpture.

Accordingly, the present invention resides in a mould assembly for moulding ice sculpture having the features of claim 1 and the use, according to claim 10, of said mould assembly in a method for making ice sculptures.

The complementary mould members may be of any material consistent with its use in forming a mould. However, it is preferred to make the complementary mould members of a material having relatively low thermal conductivity in order to provide effective control of the rate of freezing within the mould. It is particularly preferred to use a curable fibre reinforced resin as the mould member material, this material being chosen for its strength and ease of working up, as well as its desirable heat transfer properties.

The mould members may each be provided with a peripheral flange, the flanges being complementary to one another to facilitate assembly of the mould to form the open topped mould cavity. The mould members may be secured in assembly by the provision of fixing members operating to hold the peripheral flanges in abutment.

In one particularly preferred embodiment of the present invention at least some of the fixing means are resilient such that the mould members may be pushed apart in response to the characteristic expansion of the ice.

The mould members may each bear a top flange which, when the members are assembled, form a rim disposed about the opening of the assembly. This rim provides rigidity to the assembly as well as providing a retaining means for the mould liner.

The water impervious, flexible mould liner may be of latex or any other flexible material consistent with the present application. Suitable materials are those which are water impermeable at least when cured, and capable of taking the negative impression of the sculpture. Natural rubber latex is the preferred material for its ease of working up, flexibility down to low temperatures and durability.

It has been found that a compounded, pre-vulcanized natural rubber latex produced by REVERTEX INDUSTRIES (AUST) PTY. LIMITED. and sold under the trademark MR REVULTEX is particularly suitable for use in liners of the present invention. This latex has the following properties:

Total Solids Content	60-61%
Ammonia Content	0.6% (approx 360 meg/L)
pH	10.5
Modulus 700% extension	120 kg/cm ²
Tensile Strength	300 kg/cm ²
Elongation at Break	900%

Preferably, the liner is made with a split or division from the region of the open top at least part way down the liner, the split corresponding in position to the partition line between the mould members.

This split assists in the demoulding process by eliminating the need to grossly stretch the liner, resulting in superior liner life. In one preferred form of the invention, the liner is provided with lips or edge portions along the edges of the split which may be clamped between the mould members such that the lips of the liner are held in sealing engagement. If necessary a food grade sealant may also be used to ensure a water tight seal, with it being preferred to use margarine for this purpose. For most common shapes, it is sufficient for the mould to be split down one side from the open top to the apex of the inverted assembly.

The liner is preferably provided with a bead or flange about its open top, this bead or flange serving to locate the liner against the top flange of the assembled mould members.

Where the sculpture has deep reentrants which would otherwise hinder demoulding, the preferred latex mould liner may have an embedded insert of a polymeric foam, the polymeric foam having a lower heat capacity than the latex. The purpose of this insert is to facilitate demoulding by reaching its glass transition or softening temperature quickly upon removal of the mould assembly from the freezer. If the reentrant were moulded with latex only, the thick latex at this region would take considerable time to reach temperature at which the sculpture could be demoulded. However, provision of the foam insert allows demoulding of sculptures with reentrant portions to occur in about the same time as sculptures without reentrants.

Hereinafter, the term "reentrant" or "reentrant region" is taken to mean a region of the ice sculpture which is bounded by a surface such that a corresponding part of a rigid mould member conforming to that surface is incapable of being removed from it, either by virtue of not being divisible at that region to effect removal, or by virtue of the dimensions or shape of the reentrant being such that the opening or entrance to the reentrant is insufficient to permit passage of the corresponding part of the rigid mould member.

In order to prevent the sculpture freezing from the open top of the mould first, there is provided a insulative cover which closes the open top of the mould assembly. The cover preferably rests on the locating flange of the liner, thereby assisting positive location of the locating flange on the top flange of the assembly. The resilient nature of the locating flange of the liner provides a seal between the cover and the top flange, thereby improving the insulative function of the cover. At the same time, any build up of gases or displacement of excess water can escape by lifting the cover off the locating flange of the liner.

The cover may be of any insulative material consistent with its function, with it being particularly preferred to use polystyrene or other rigid polymer foam.

It is particularly preferred to use a cover having a depression in its lower surface, such as may be formed by making the cover from a substantially annular lower portion conforming to the top flange, and an upper substantially flat portion closing the annulus. The thickness of the annulus then defines the desirable depression. The depression is desired to prevent the cover from contacting and adhering to the top surface of the ice on expansion. It is particularly desirable when the cover is made from relatively fragile foam material such as polystyrene, since removal of cover which is stuck to the ice may result in bits of the cover breaking off and remaining on the ice.

The improvement of the present invention resides in providing the mould assembly with means serving to vary the rate of heat transfer through the walls of the mould assembly. It has been found that if the narrow or protuberant portions of the ice sculpture are encouraged to freeze before the bulk of the sculpture, the stresses which accumulate to cause cracking in the prior art moulds are relieved into the still liquid bulk and are thereby dispersed. Similarly, if a sculpture has a narrow "waist" region such as an hourglass or seahorse shape, then stress concentration can occur by this "waist" freezing right through first and dividing the bulk of the liquid water into two bodies. It has been found that providing thermal insulation at the narrow region of the mould assembly prevents premature freezing through this region allowing the bulk of the liquid to freeze progressively as one body and thereby avoiding the concentration of stresses at the narrow portions. In prior art moulds and in particular for metal moulds, the rate of heat transfer is such that the ice forms at all points of the inner surface of the mould at the same time, reducing the opportunity for stress relief and causing the aforementioned stress accumulation.

In the present invention, varying the rate of heat transfer, and therefore freezing, such that protuberant portions of the sculpture freeze before the bulk may be effected by any practical means such as varying the thickness of the mould, varying the material used at the protuberant portions of the mould members or by applying lower temperatures to the protuberant portions. However, for simplicity of manufacture and use it is preferred that the rate of heat transfer be modified by providing the mould members with perforations therethrough. The perforations may be of any size up to a diameter where the liner bulges through them. The perforations are suitably of greatest total area at the protuberant regions of the mould members directly exposing the mould liner at these regions to the freezing atmosphere or the freezer. The size and/or area density of the perforations may then taper off to the less protuberant or bulk regions of the mould members. Of course the maximum area of the perforations obtainable will be a combined function of the size and number of perforations in the region and the structural strength of the material of the mould members at that region.

Similarly, many means of insulating the narrow regions of a mould assembly to prevent premature freezing are contemplated. For example, the insulation may be achieved by externally applying to the mould an insulative material. Suitable insulative materials include flexible polymeric foams, glass fibre batts, self blowing and curing rigid polyurethane foams and the like. Alternatively, the insulation may be incorporated into the substance of the mould member itself during manufacture thereof, or may be incorporated in the substance of the liner. Where the insulation is incorporated into the liner however, it is

desirable to use a flexible insulative plastic foam of lower volumetric heat capacity than the latex of the liner such that the insulative material softens quickly to assist in demoulding of the ice sculpture.

The invention will be further described with reference to embodiments thereof as illustrated in the accompanying drawings.

5 FIG 1 is an elevation of a mould assembly in accordance with the present invention.

FIG 2 is a perspective view of the mould assembly of Fig 1, with the insulating cover removed for clarity.

FIG 3 is a section through an arbitrary mould in accordance with the present invention, illustrating the use of insulation on narrow sections.

10 FIG 4 is a section through an arbitrary mould in accordance with the present invention, illustrating the split liner of a preferred mould assembly.

FIG 5 is a section through an arbitrary mould in accordance with the present invention, illustrating the use of foam of low heat capacity to permit the moulding of reentrant forms.

In the figures, complementary rigid mould members 1 and 2 are provided with peripheral mating flanges 3 and 4 respectively and in assembly provide an open topped mould.

15 Around the top edge of mould members 1 and 2 are top flanges 5 and 6 respectively, the top flanges in assembly providing a continuous substantially horizontal rim about the open top of the mould assembly. The peripheral mating flanges 3 and 4 are provided with complementary holes 7 providing passage for either rigid fixing means consisting of a nut 8, a washer 9 and a bolt 10, or resilient fixing means consisting of an elongate bolt 11, spring 12, washer 13 and nut 14.

20 Where the sculpture to be moulded is protuberant, the mould members 1 and 2 are provided with perforations 15 serving to increase the rate of heat transfer out of the mould assembly at these regions and thereby causing the protuberant portions of the sculpture to freeze first. Where the sculpture is narrow, the mould members 1 and 2 are provided with an insulative material 16 serving to retard the rate of heat transfer out of the mould assembly at this region and thereby retard the freezing of the narrow portion relative to the rest of the sculpture. The assembly is supported in its upright position in a cradle 17.

25 Within the assembled mould members 1 and 2 is a flexible mould liner 18. The mould liner 18 is split or divided at 19 part way around its periphery corresponding in position of the rigid fixing means. The split at 19 is provided with lips 20 and 21 adapted to be clamped between the peripheral flanges 3 and 4 of the mould members 1 and 2 to provide a watertight seal of the split 19 in use.

30 The mould liner 18 is provided at its upper bounds with a flange 22 adapted to lie flat against the top flanges 5 and 6 of the mould members 1 and 2 respectively.

At reentrant regions 23 of the ice sculpture the mould liner 18 conforms in surface to the reentrant region 23, the mould liner 18 being back-filled with a foam insert 24, the foam insert 24 being of lower volumetric heat capacity relative to that of the liner 18 such that it softens and becomes deformable upon warming (in less time than a corresponding insert of latex would soften,) in order to reduce demoulding times. Of course, if the rigid mould members 1 and 2 were permitted to conform to the reentrant portions without filling, the sculpture would be impossible to demould in extreme cases.

The mould assembly is provided with an insulative cover 25 which is adapted to seat on the flange 22 of the liner 18 to prevent the ice sculpture from freezing from the top down.

40 In use, the mould assembly is generally configured such that the top of the mould assembly corresponds to the base of the finished sculpture. The mould members 1 and 2 are assembled around the liner 18 such that the lips 20 and 21 are clamped between the peripheral flanges 3 and 4 of the mould members 1 and 2, and such that the flange 22 of the mould liner 18 lies flat on the flanges 5 and 6 of the mould members 1 and 2. The nuts 8, bolts 10 and washers 9 are installed through the holes 7 corresponding in position to the lips 20 and 21 and are tightened to seal the lips together against the leakage. If desired, the lips 20 and 21 can be smeared on their mating faces with a food grade sealant such as margarine to ensure water tightness.

45 The mould assembly is then supported in the cradle 17 such that its top flanges 5 and 6 lie in a substantially horizontal plane. The mould assembly is then filled with water to a level allowing for expansion on freezing, and the insulative cover 25 is installed on the flange 22 of the liner 18. The assembled and filled mould is then presented to a freezing environment and allowed to freeze solid.

50 When the sculpture is frozen, it is demoulded by removing the cover 25, removing the mould assembly from the cradle 17, inverting the mould assembly such that the surface of the ice exposed at the top is resting on a suitable support and then removing the fixing means to enable the complementary mould members 1 and 2 to be separated from the liner 18. When the foam inserts 24 (if any) have softened sufficiently to permit, the mould liner 18 is parted at the split 19 and peeled off the sculpture.

Particular advantages of this embodiment over the moulds disclosed in the prior art and especially US-A-4669271 include the provision of the split 19, provision of the resilient fixing means (11, 12, 13 and 14),

and provision of the foam inserts 24, in addition to the stated advance over the prior art generally of selectively varying the rate of heat transfer.

Firstly, the presence of the split 19 enable the mould liner 18 to be made thicker than the corresponding liner of US-A-4669271, whilst improving the demouldability of the sculptures. The advantage lies in the resistance of the thicker liner to tearing, relative to the thinner liner, resulting in improved liner life. Also, the presence of the split 19 enables more complex shapes to be moulded without having to have recourse to the pleats specified for the envelope of US-A-4669271, which pleats detract from the finish and detail of the ice sculpture.

Secondly, the resilient fixing means of the present embodiment permits expansion of the ice laterally whereas the ice moulds of US-A-4669271 only permit the expansion of the ice through the open top of the mould. The advantage in this difference is that the present mould has reduced tendency to accumulate stresses generally, whilst retaining superior detail transfer from the liner to the sculpture.

Thirdly, the moulds of US-A-4669271 are incapable of moulding ice sculptures which have reentrant regions, since the thin envelope is conformed to by the sidewalls irrespective of the profile of the sculpture. For example, it would be impossible to use the moulds of US-A-4669271 if it were required to mould a sculpture having reentrant impression where the opening of the impression were smaller than the dimension of the impression, since such a sculpture would be impossible to demould. The rigid sidewall corresponding to the impression would be effectively locked into the ice. The present embodiment on the other hand, by its provision of the foam inserts 24, enables such impressions to be moulded since the mould members 1 and 2 do not have to enter the impression.

Claims

1. A mould assembly for moulding ice sculpture having
 - (i) complementary mould members (1,2) defining an open topped mould cavity;
 - (ii) a water impervious flexible mould liner (18) conforming to the interior of the cavity;
 - (iii) a thermally insulating cover (25) adapted to close the open top of the cavity,
 characterised in that there is provided thermal insulation (16) at narrow portions of the sculpture to reduce the rate of heat transfer therethrough, and a plurality of perforations (15) through the walls of the mould adjacent protuberant portions of the sculpture.
2. A mould assembly in accordance with claim 1, wherein the complementary mould members (1,2) are made from a material having low thermal conductivity.
3. A mould assembly in accordance claim 1, wherein each of the complementary mould members (1,2) are provided with complementary flanges (3,4), the mould members (1,2) being removably attached to each other via fixing means (8,9,10,11,12,13,14) operating to retain the flanges in abutment.
4. A mould assembly as claimed in any preceding claim wherein the open top of the cavity is rimmed by a top flange (5,6), said top flange (5,6) in use being in abutment with a corresponding flange portion (22) of the mould liner (18).
5. A mould assembly as claimed in any one of the preceding claims wherein the mould liner (18) comprises a split region (19) around at least part of its periphery to facilitate removal of the mould liner (18) from the ice sculpture, whereby mating lips (20,21) of the split region are held in sealing engagement by clamping between adjacent mould members (1,2).
6. A mould assembly as claimed in any one of the preceding claims wherein the mould liner (18) is comprised of a natural rubber latex material.
7. A mould assembly as claimed in Claim 6 wherein areas of the mould liner (18) corresponding to reentrant portions of the sculpture comprise inserts (24) of foam material encapsulated in the latex material, the foam material being of lower specific heat than the latex material.
8. A mould assembly as claimed in any one of claims 5 to 7 wherein the fixing means comprises rigid fixing means (8,9,10) at the split region and resilient fixing means (11,12,13,14) elsewhere, the resilient fixing means (11,12,13,14) being such that the mould assembly can expand in response to expansion of the ice upon freezing.



and provision of the foam inserts 24, in addition to the stated advance over the prior art generally of selectively varying the rate of heat transfer.

Firstly, the presence of the split 19 enable the mould liner 18 to be made thicker than the corresponding liner of US-A-4669271, whilst improving the demouldability of the sculptures. The advantage lies in the resistance of the thicker liner to tearing, relative to the thinner liner, resulting in improved liner life. Also, the presence of the split 19 enables more complex shapes to be moulded without having to have recourse to the pleats specified for the envelope of US-A-4669271, which pleats detract from the finish and detail of the ice sculpture.

Secondly, the resilient fixing means of the present embodiment permits expansion of the ice laterally whereas the ice moulds of US-A-4669271 only permit the expansion of the ice through the open top of the mould. The advantage in this difference is that the present mould has reduced tendency to accumulate stresses generally, whilst retaining superior detail transfer from the liner to the sculpture.

Thirdly, the moulds of US-A-4669271 are incapable of moulding ice sculptures which have reentrant regions, since the thin envelope is conformed to by the sidewalls irrespective of the profile of the sculpture. For example, it would be impossible to use the moulds of US-A-4669271 if it were required to mould a sculpture having reentrant impression where the opening of the impression were smaller than the dimension of the impression, since such a sculpture would be impossible to demould. The rigid sidewall corresponding to the impression would be effectively locked into the ice. The present embodiment on the other hand, by its provision of the foam inserts 24, enables such impressions to be moulded since the mould members 1 and 2 do not have to enter the impression.

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1. A mould assembly for moulding ice sculpture having
 - (i) complementary mould members (1,2) defining an open topped mould cavity;
 - (ii) a water impervious flexible mould liner (18) conforming to the interior of the cavity;
 - (iii) a thermally insulating cover (25) adapted to close the open top of the cavity,
 characterised in that there is provided thermal insulation (16) at narrow portions of the sculpture to reduce the rate of heat transfer therethrough, and a plurality of perforations (15) through the walls of the mould adjacent protuberant portions of the sculpture.
2. A mould assembly in accordance with claim 1, wherein the complementary mould members (1,2) are made from a material having low thermal conductivity.
3. A mould assembly in accordance claim 1, wherein each of the complementary mould members (1,2) are provided with complementary flanges (3,4), the mould members (1,2) being removably attached to each other via fixing means (8,9,10,11,12,13,14) operating to retain the flanges in abutment.
4. A mould assembly as claimed in any preceding claim wherein the open top of the cavity is rimmed by a top flange (5,6), said top flange (5,6) in use being in abutment with a corresponding flange portion (22) of the mould liner (18).
5. A mould assembly as claimed in any one of the preceding claims wherein the mould liner (18) comprises a split region (19) around at least part of its periphery to facilitate removal of the mould liner (18) from the ice sculpture, whereby mating lips (20,21) of the split region are held in sealing engagement by clamping between adjacent mould members (1,2).
6. A mould assembly as claimed in any one of the preceding claims wherein the mould liner (18) is comprised of a natural rubber latex material.
7. A mould assembly as claimed in Claim 6 wherein areas of the mould liner (18) corresponding to reentrant portions of the sculpture comprise inserts (24) of foam material encapsulated in the latex material, the foam material being of lower specific heat than the latex material.
8. A mould assembly as claimed in any one of claims 5 to 7 wherein the fixing means comprises rigid fixing means (8,9,10) at the split region and resilient fixing means (11,12,13,14) elsewhere, the resilient fixing means (11,12,13,14) being such that the mould assembly can expand in response to expansion of the ice upon freezing.



9. A mould assembly as claimed in claim 8 wherein each of the resilient fixing means comprises a nut (14) and bolt (11) assembly passing through the complementary flanges (3,4) and having at least one spring (12) interposed between the nut (14) and/or bolt (11) and the complementary flanges (3,4).
- 5 10. Use of a mould assembly in accordance with any one of the preceding Claims in a method for making ice sculptures including the steps of :-
 (a) locating the water impervious flexible liner (18) in the mould cavity;
 (b) filling the mould liner (18) with water to a level such that expansion of the ice on freezing substantially fills the liner;
 10 (c) closing the open top with the thermally insulating cover (25);
 (d) placing the mould assembly in a freezing environment to effect freezing of the water into an ice sculpture;
 (e) removing the mould members (1,2) from the liner (18), and
 (f) removing the liner (18) from the ice sculpture.

15 Patentansprüche

1. Form für die Formung von Eisskulpturen mit
 (i) komplementären Formteilen (1,2), die einen oben offenen Formhohlraum begrenzen,
 20 (ii) einer wasserundurchlässigen, flexiblen Formauskleidung (18), die dem Inneren des Hohlraums angepaßt ist,
 (iii) einem thermisch isolierenden Deckel (25), mit dem das oben offene Ende des Hohlraums verschlossen werden kann,
 dadurch gekennzeichnet, daß eine thermische Isolierung (16) an engen Teilen der Skulptur
 25 vorgesehen ist, um dort den Wärmedurchgang zu reduzieren, und an vorstehenden Teilen der Skulptur mehrere durch die Formwandungen gehende Lochungen (15) vorgesehen sind.
2. Form nach Anspruch 1, bei der die komplementären Formteile (1,2) aus einem Material mit niedriger Wärmeleitfähigkeit hergestellt sind.
- 30 3. Form nach Anspruch 1, bei der jedes der komplementären Formteile (1,2) mit komplementären Flanschen (3,4) versehen sind, wobei die Formteile (1,2) durch Befestigungsmittel (8,9, 10,11,12,13,14), die so wirken, daß die Flansche in Anlage gehalten werden, lösbar aneinander angebracht sind.
- 35 4. Form nach einem vorhergehenden Anspruch, bei der das offene obere Ende des Hohlraums mit einem Oberteilflansch (5,6) versehen ist, der bei Benutzung einem entsprechenden Flanschteil (22) der Formauskleidung (18) anliegt.
- 40 5. Form nach einem der vorhergehenden Ansprüche, bei der die Formauskleidung (18) längs wenigstens eines Teils ihres Umfangs zur leichteren Entfernung der Formauskleidung (18) von der Eisskulptur einen geschlitzten Bereich (19) aufweist, wobei die aneinander angepaßten Lippen (20,21) des geschlitzten Bereiches durch Einklemmen zwischen den anliegenden Formteilen (1,2) in Dichtungseingriff gehalten werden.
- 45 6. Form nach einem der vorhergehenden Ansprüche, bei der die Formauskleidung (18) aus einem Naturgummilatematerial besteht.
7. Form nach Anspruch 6, bei der Flächen der Formauskleidung (18), die zurückspringenden Teilen der Skulptur entsprechen, in das Latexmaterial eingekapselte Einsätze (24) aus einem Schaumstoff aufweisen, der eine geringere spezifische Wärme als das Latexmaterial hat.
- 50 8. Form nach einem der Ansprüche 5 bis 7, bei der die Befestigungsmittel starre Befestigungsmittel (8,9,10) im geschlitzten Bereich und federnde Befestigungsmittel (11,12, 13,14) an anderer Stelle umfaßt, wobei die federnden Befestigungsmittel (11,12,13,14) derart sind, daß die Form sich entsprechend der Ausdehnung des Eises beim Gefrieren ausdehnen kann.
- 55 9. Form nach Anspruch 8, bei der jedes federnde Befestigungsmittel eine Mutter (14) und einen durch die komplementären Flansche (3,4) hindurchgehenden Bolzen (11) umfaßt und zwischen der Mutter (14)



und/oder dem Bolzen (11) und den komplementären Flanschen (3,4) wenigstens eine Feder (12) angeordnet ist.

10. Verwendung einer Form nach einem der vorhergehenden Ansprüche bei einem Verfahren zur Herstellung von Eisskulpturen, bei dem man
- (a) die wasserundurchlässige, flexible Auskleidung (18) in dem Formhohlraum anordnet,
 - (b) die Formauskleidung (18) bis zu einem solchen Niveau mit Wasser füllt, daß die Ausdehnung des Eises beim Gefrieren die Auskleidung im wesentlichen ausfüllt,
 - (c) das offene Oberteil mit dem thermisch isolierenden Deckel (25) verschließt,
 - (d) die Form in einer gefrierenden Umgebung plaziert, um das Gefrieren des Wassers zu einer Eisskulptur zu bewirken,
 - (e) die Formteile (1,2) von der Auskleidung (18) entfernt, und
 - (f) die Auskleidung (18) von der Eisskulptur entfernt.

15 Revendications

1. Moule pour mouler des sculptures en glace comprenant des éléments de moule complémentaires (1, 2) définissant une cavité de moulage ouverte à sa partie supérieure, un revêtement (18) d'une matière flexible imperméable recouvrant la surface de la cavité de moulage, un couvercle (25) en matière isolante et adapté pour fermer la partie supérieure ouverte de la cavité, caractérisé en ce qu'il est prévu une isolation thermique (16) dans les parties étroites de la sculpture afin de réduire le rapport de transmission de chaleur et une pluralité de perforations (15) à travers les parois de moule adjacentes aux parties protubérantes de la sculpture.
2. Moule, selon la revendication 1, caractérisé en ce que les éléments de moule complémentaire (1, 2) sont réalisés dans une matière ayant une faible conductivité thermique.
3. Moule, selon la revendication 1, caractérisé en ce que chaque élément complémentaire (1, 2) du moule présente un bord complémentaire (3, 4), lesdits éléments étant montés d'une manière amovible par l'intermédiaire de moyens de fixations (8, 9, 10, 11, 12, 13, 14) agencés afin de maintenir les bords en butée l'un contre l'autre.
4. Moule, selon les revendications précédentes, caractérisé en ce que l'ouverture de la partie supérieure est terminée par un rebord (5, 6) destiné à recevoir l'extrémité correspondante du revêtement de matière flexible imperméable (22).
5. Moule, selon les revendications précédentes, caractérisé en ce que le revêtement de matière flexible imperméable (18) présente une fente (19) s'étendant, au moins, autour de sa périphérie pour faciliter l'enlèvement dudit revêtement de la sculpture de glace et des lèvres d'accouplement (20, 21) dans la région de la fente (19) destinées à être maintenues par des organes de fixation des éléments (1, 2) du moule.
6. Moule, selon les revendications précédentes, caractérisé en ce que le revêtement flexible imperméable (18) est en un caoutchouc naturel.
7. Moule, selon la revendication 6, caractérisé en ce que la surface du revêtement flexible imperméable (18) correspondant à des parties rentrantes de la sculpture comprend des inserts (24) d'une matière cellulaire insérée dans le caoutchouc, ladite matière cellulaire présentant une plus petite chaleur spécifique que le caoutchouc.
8. Moule, selon l'une des revendications 5 à 7, caractérisé en ce que les organes de fixation des éléments de moule (1, 2) comprennent des moyens rigides (8, 9, 10) situés dans le voisinage de la fente (19) et des moyens de fixation élastiques (11, 12, 13, 14) afin que les éléments du moule (1, 2) puissent s'écarter en réponse à l'expansion provoquée par la formation de glace.
9. Moule, selon la revendication 8, caractérisé en ce que chacun des organes de fixation élastiques (11, 12, 13, 14) comprend un écrou (14) et une vis (11) traversant des trous des bords complémentaires (3, 4) et, au moins, un ressort (12) interposé entre l'écrou ou la vis et le bord correspondant.



2)

10. Procédé pour fabriquer une sculpture en glace et utilisant un moule suivant l'une quelconque des revendications précédentes et incluant les phases suivantes :

- a) mise en place du revêtement flexible imperméable dans le moule,
- b) remplissage du moule d'eau à l'intérieur du revêtement (18), le niveau d'eau étant tel que, lors de l'expansion correspondant à la prise de la glace, le revêtement soit plein.
- c) fermeture de l'extrémité supérieure ouverte du moule par un couvercle (25) thermiquement isolant.
- d) engagement du moule dans un environnement de congélation de l'eau pour réaliser la sculpture de glace.
- e) séparation du revêtement des éléments du moule,
- f) séparation du revêtement de la sculpture de glace.

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