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F25C 5/14

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US 5752394 A
US 5634344 A

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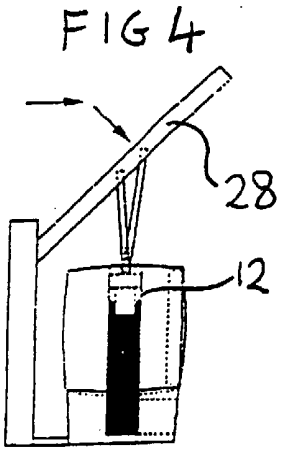
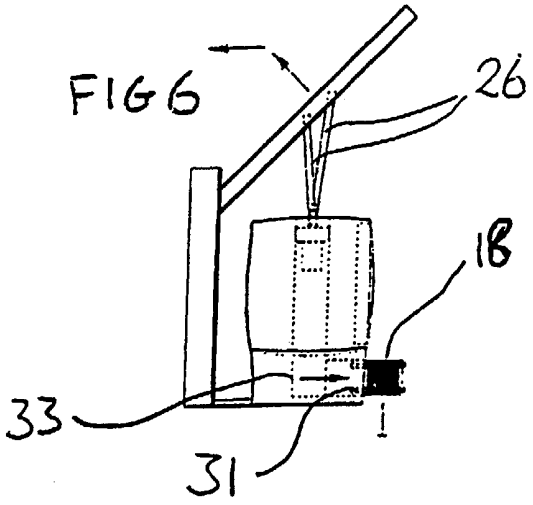
(54) Abstract Title
Making a drinking vessel from ice

(57) An apparatus for making a drinking vessel from ice comprises a chamber 12 for receiving ice preferably flaked ice; a compressor for compressing ice in the chamber into a mould for a drinking vessel 18; and a mould fitting for fitting the mould in position for receiving ice from the chamber 12. An ice maker may be provided integrally with the apparatus or separately. The drinking vessel formed may be in the shape of a small glass.





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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

FIG 1

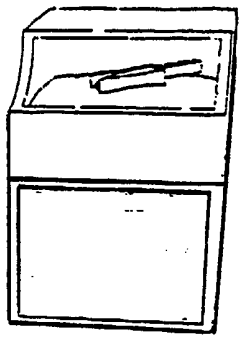


FIG 2

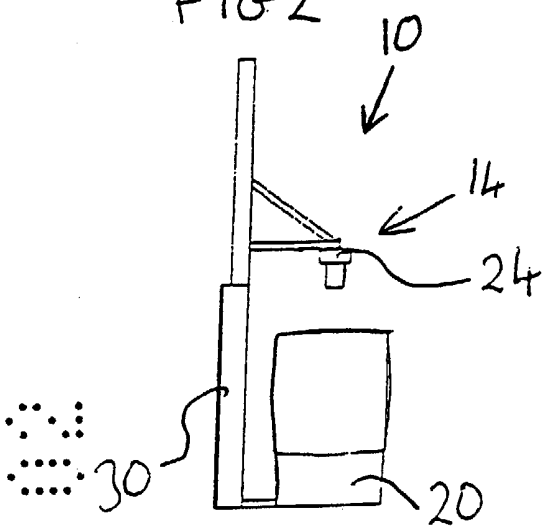


FIG 3

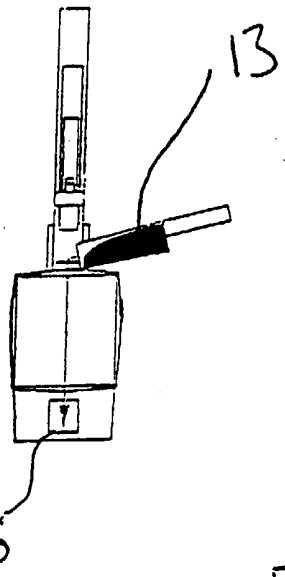


FIG 4

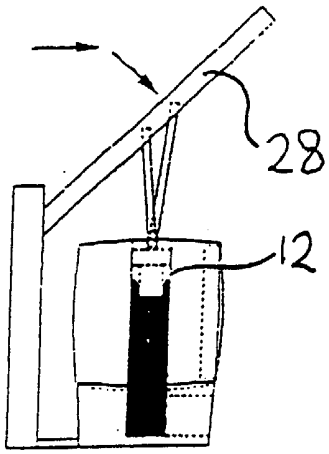


FIG 5

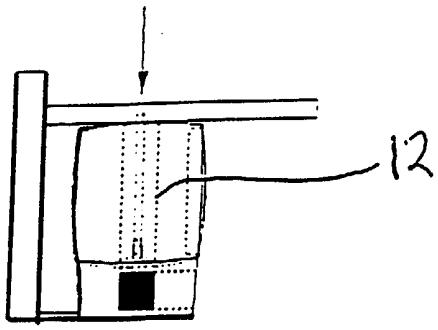
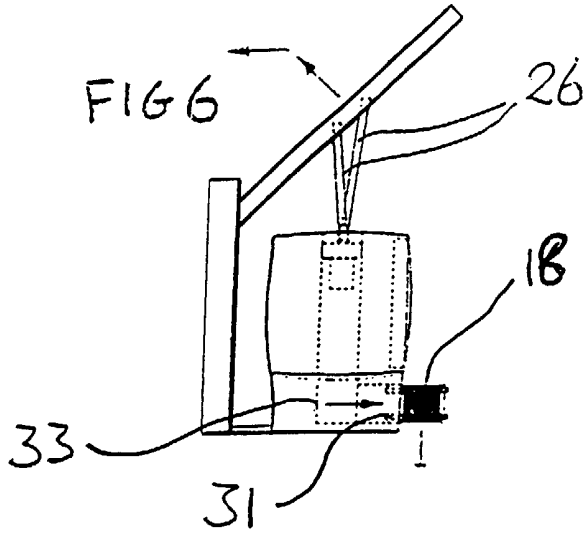


FIG 6



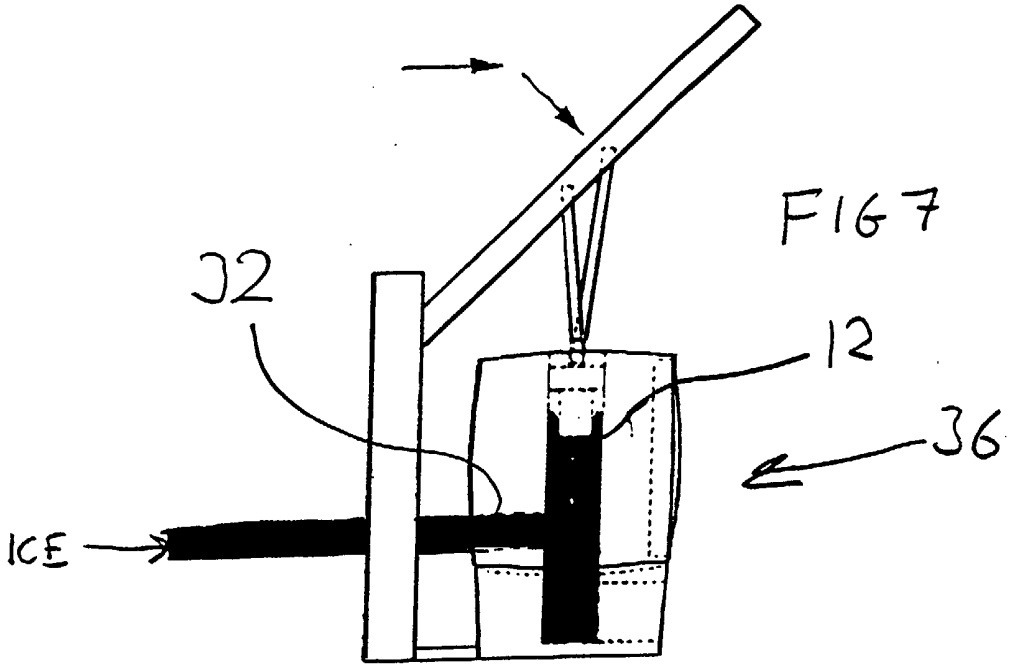


FIG 7

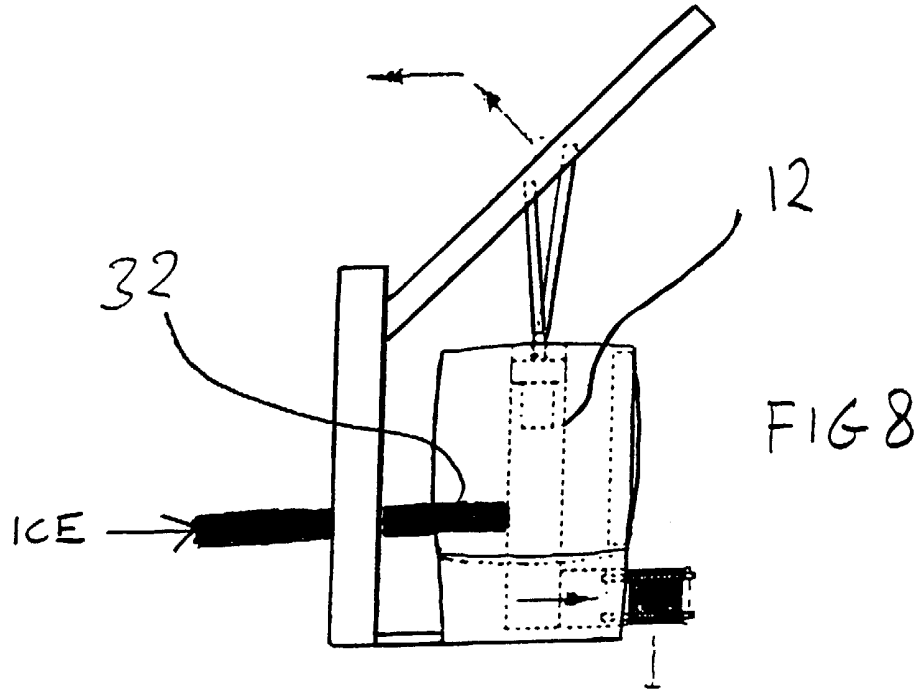


FIG 8

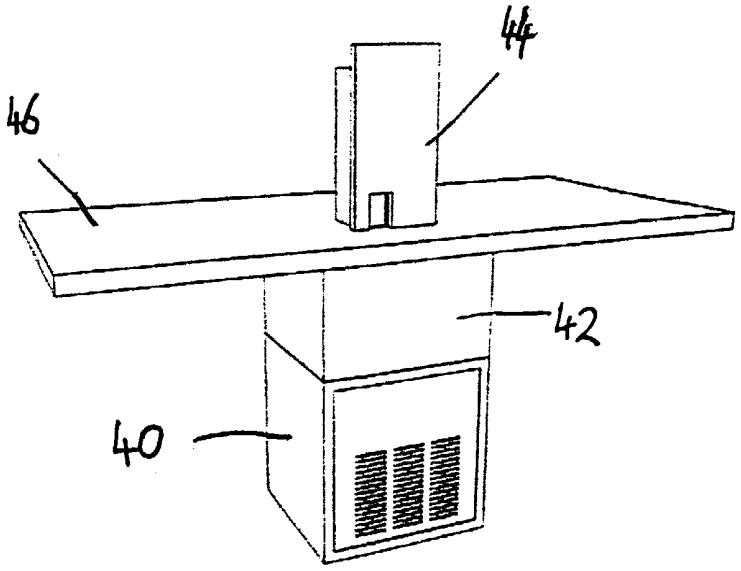


FIG 9

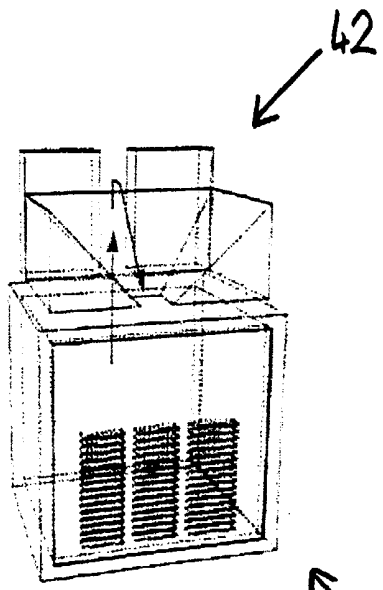


FIG 10

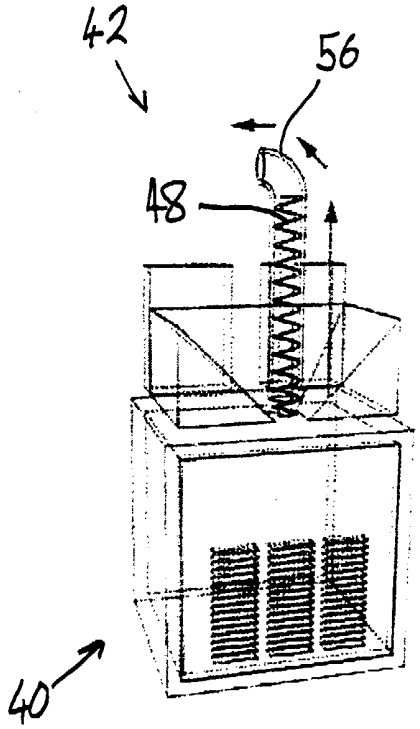


FIG 11

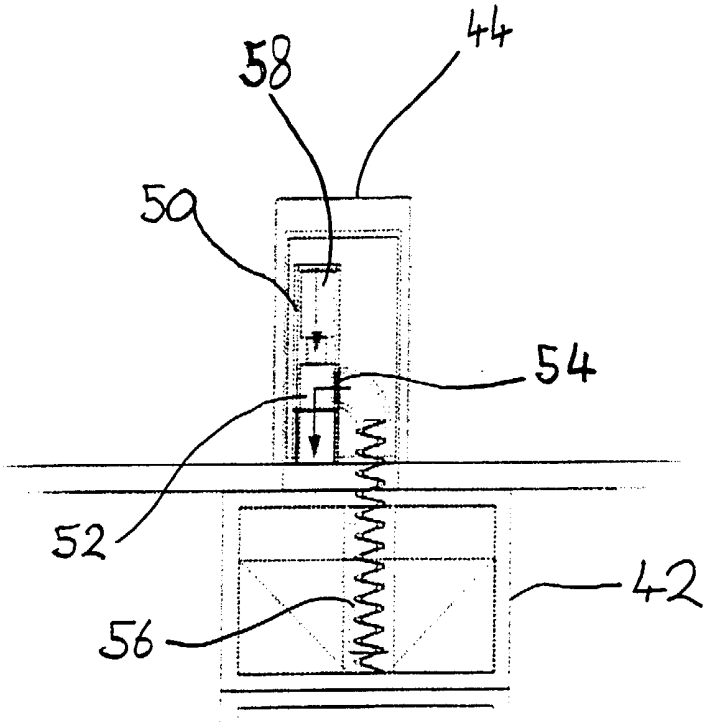


FIG 12

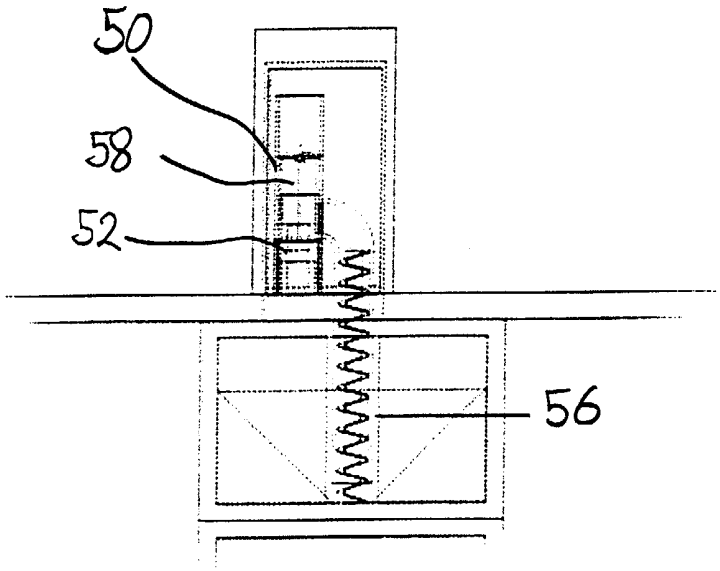


FIG 13

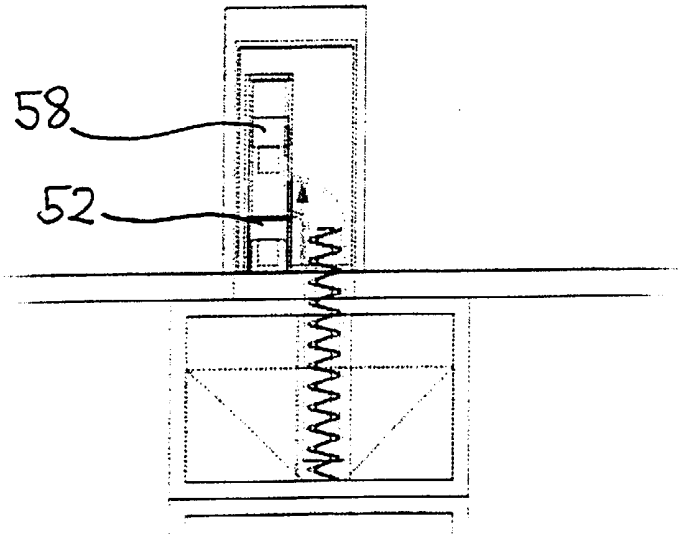


FIG 14

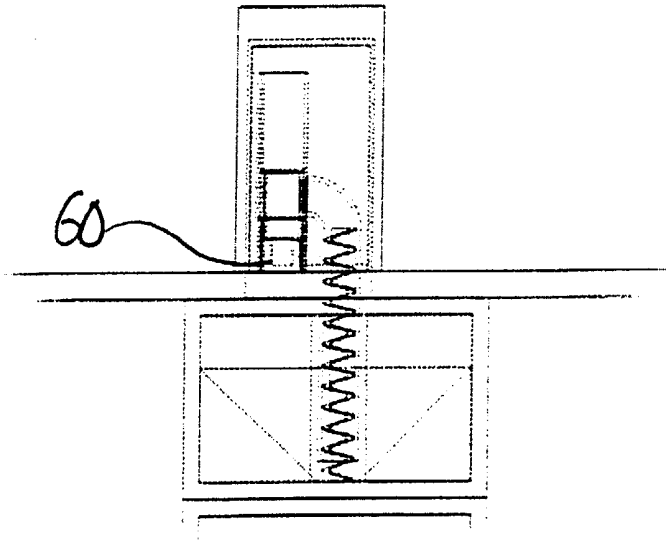


FIG 15

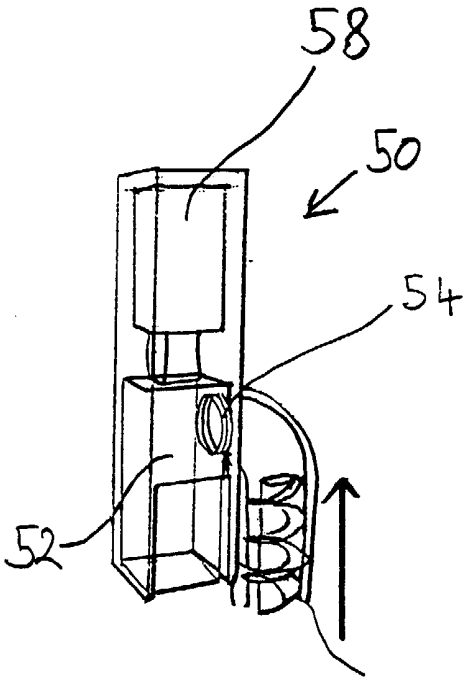


FIG 16

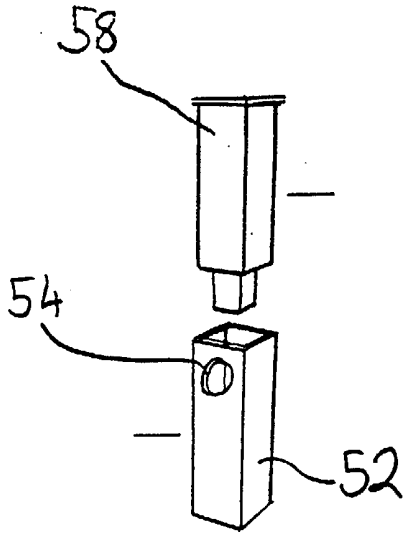


FIG 17

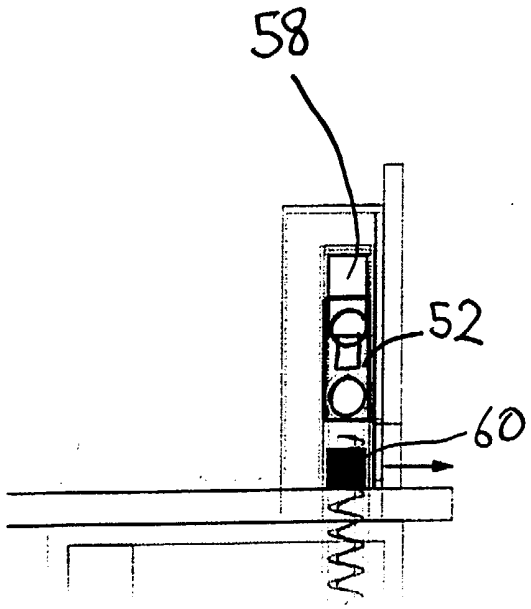


FIG 18

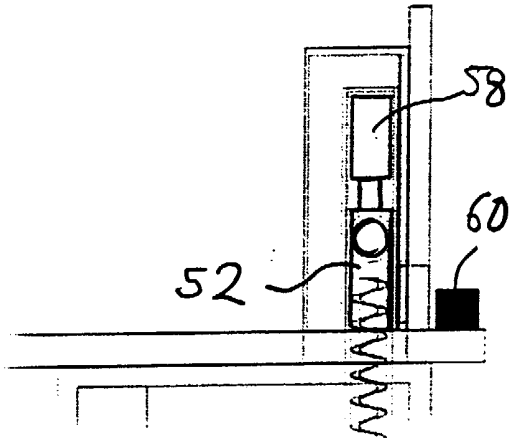


FIG 19

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Apparatus and Method for making a Drinking Vessel from Ice

The present invention relates to an apparatus and method for making a drinking vessel from ice.

Ice cubes are commonly used to reduce or maintain the temperature of drinks. In bars, restaurants and the like, drinks may be served with ice or ice cubes may be available at the counter for customers use.

As well as ice cubes, drinking vessels made from ice are known. According to a known prior art method, the drinking vessels are made by pouring water into specially shaped ice trays and placing the ice trays in a freezer. Once frozen, the ice trays are separated from the ice to expose one or more of the drinking vessels. There are considerable time restraints with this prior art method, since the temperature at which freezers are generally maintained (about -5°C) means that water in the trays takes several hours to freeze and freezers maintained at much lower temperatures are more expensive. Also the trays have to be filled manually which is somewhat inconvenient and time consuming.

An object of the present invention is to provide an improved apparatus and method for making a drinking vessel from ice.

The present invention provides an apparatus for making a drinking vessel from ice, comprising: a chamber for receiving ice; compacting means for compacting ice in the chamber into a mould for a drinking vessel; and a mould fitting for fitting a mould in position to receive ice from the chamber.

Preferably, the mould fitting can fit any one of a plurality of differently shaped moulds in position to receive ice from the chamber.

The apparatus may comprise a mould for a drinking vessel. The mould or moulds may be sold together with the rest of the apparatus or separately as an after sales purchase to expand the range of drinking vessels which can be moulded.

Means for ejecting a drinking vessel from the apparatus after moulding may also be provided.

The compacting means may comprise a piston mounted for sliding movement in the chamber, movement of the piston in a first direction compacting ice in the chamber into a mould for the drinking vessel.

The ejecting means may be triggered by movement of the piston in an opposite direction.

The chamber in one possible arrangement is connectable to a feed of an ice maker whereby ice can be deposited in the chamber on demand and in this arrangement movement of the piston in an opposite direction may trigger feeding of ice into the chamber.

The apparatus may comprise means for introducing advertising material into the chamber or mould so that the advertising material can be viewed in or on the drinking vessel after moulding.

The apparatus may comprise an ice maker which is preferably a flaked ice maker.

The present invention also provides a method of making a drinking vessel from ice comprising the steps of: placing ice into a chamber; compacting the ice in the chamber into a mould to form a drinking vessel; and removing the drinking vessel from the mould.

The ice that is used is preferably flaked ice and in this case the drinking vessel may be formed by regelation.

In order that the present invention may be well understood, three embodiments thereof, which are given by way of example only will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a flaked ice making machine;

Figures 2 to 6 show a manual version of an apparatus for making a drinking vessel from ice, each Figure showing a different functional stage;

Figures 6 and 7 show an automated version of an apparatus for making drinking vessels from ice; and

Figures 9 to 19 show another automated version of an apparatus for making drinking vessels from ice, in various stages thereof.

Referring to Figures 1 to 6, an apparatus for making a drinking vessel from ice is shown generally at 10 and comprises a chamber 12 for receiving ice 13; compacting means 14 for compacting ice in the chamber into a mould 16 for a drinking vessel 18; and a mould fitting 20 for fitting the mould 16 in position for receiving ice from the chamber 12. An ice maker 22 may be provided integrally with apparatus 10 or separately as shown in Figure 1.

The chamber 12 may have a funnelled mouth which helps it to be filled. The chamber 12 is preferably sized to receive the amount of ice required to make a single drinking vessel.

The compacting means 14 comprises a piston 24; and one or more piston arms 26 which connect the piston 24 to a lever 28. The piston 24 is preferably shaped to form an interior surface of the drinking vessel 18 when the ice 13 is compacted into the mould 16. Lever 28 is operable in a clockwise direction as viewed in Figure 4 to compact ice 13 in the chamber 12 and in an anti-clockwise direction as viewed in Figure 6 to return to a start position. Lever 28 is supported for pivotal movement on a frame 30 on which may be connected the chamber 12 and mould fitting 20. The compacting means shown in Figures 2 to 6 is operable manually although it is conceived that the compacting means may be operable by a motor. A motor operated compacting means will not be described in detail here but could readily be put into effect by a skilled person.

The mould fitting 20 is adapted to fit any one of a plurality of differently shaped moulds 16 in position to receive ice from the chamber 12. The mould fitting (see Figure 6) comprises a mould frame 31 for holding a mould 16. The frame 31 is movable by sliding to a position in which a mould 16 can be placed thereinto and to a position in a cavity 33 in the mould fitting 20 to locate a mould 16 for receiving ice from the chamber 12. The mould frame 31 is preferably adjustable to receive any one of a plurality of differently shaped moulds 16. It is currently the intention that the mould 16

selected is suitable for making a 'shot glass'. A so-called shot glass is a small glass for receiving a measure of usually spirits, such as vodka, for drinking in one go. However, other types of drinking vessels can be made by the apparatus 10.

A method of making a drinking vessel will now be described.

When the apparatus 10 and compacting means 14 are in the start position, ice 13 is deposited in chamber 12. Some ice 13 drops through chamber 12 and into mould 16 at this stage.

Lever 28 is pivoted clockwise (Figure 4) which slides piston 24 in chamber 12 in a first direction to compact ice 13 into the mould 16.

The type of ice which is preferably used in apparatus 10 is flaked ice which has a low density i.e. the quantity of ice per unit volume is relatively low as compared with ice cubes for instance. The consistency of snow is also suitable for use with apparatus 10.

When piston 24 is moved in the first direction, the volume in the chamber 12 is reduced which forces the ice 13 into a more closely packed arrangement. Also, the pressure on the ice in the chamber 12 and the mould 16 increases thereby increasing its temperature. As the temperature increases some of the ice 13 melts to fill the gaps between the ice. When the pressure is released, this water re-freezes creating a single piece of ice in the shape of a drinking vessel. This process is known as regelation. The apparatus 10 may be cooled if desired.

When lever 28 is pivoted in an anti-clockwise direction, piston 24 is moved in a second direction towards the start position. This releases the mould 16 in frame 31 which can be withdrawn from the apparatus allowing the drinking vessel to be removed from the mould 16. Optionally, when the piston is moved in the second direction, a sensor (electronic or mechanical) may be triggered which causes the drinking vessel (and mould) to be actively expelled or ejected from the apparatus. Such an expulsion mechanism could be spring loaded - the movement of the lever or piston causing loading of the spring.

If it is desired to make a further drinking vessel, the method can be repeated either with the same or a differently shaped mould.

Figures 7 and 8 show a modified apparatus 36 for making a drinking vessel from ice. In this apparatus, chamber 12 has a feed, in the form of a cooled feed pipe 32, which is connected to an ice maker (not shown). The feed enables the chamber 12 to be fitted automatically either on demand or to be triggered by a suitable sensor during movement of the piston 24 in the second direction. The use of a feed for automatically filling the chamber 12 considerably increases the speed and ease by which drinking vessels can be made.

A currently preferred embodiment of the present invention is shown in Figures 9 to 19. Figure 9 shows an apparatus for making a drinking vessel from ice and comprises a flaked ice maker and storage bin therefor. As will be seen from Figures 10 and 11, flaked ice made by the ice maker is deposited

in a storage bin or container means prior to delivery to the chamber. Conveying means in the form of a rotating screw or Archimedean screw delivers flaked ice to the chamber and into an outer or female mould (through a feed connection in the form of an aperture in the chamber and an aperture in the outer mould) along a feed in the form of a feed pipe as shown in Figures 11 and 12. A piston comprising a male mould part is moved downwards in the chamber for compacting ice in the chamber in the outer or female mould as shown in Figure 13 and 14. The piston can be moved by any suitable means such as a lever system as shown in Figures 1 to 6 or a motor. Once the drinking vessel is moulded, the outer mould and male part are moved upwards as shown in Figure 15 to reveal the drinking vessel for removal.

Figure 16 shows a view of the chamber with the mould parts in more detail. Figure 17 shows each of the mould parts without the chamber, the outer mould being shown with the aperture through which ice can be fed from the feed pipe. Although not shown in the Figure 17, the outer mould is formed by a hollow rectangular cylinder i.e. open at both ends. Referring to Figures 18 and 19, which show the apparatus in section, after moulding the outer mould is moved to a first, or upper, position while the male part is stationary to maintain the position of the drinking vessel. The male part is then withdrawn upwards to allow removal of the moulded drinking vessel. This represents the position shown in Figure 18. In figure 19, the outer mould is shown having been moved downwards to a second, or lower, position in which the outer mould can receive ice from the feed for moulding.

The measurements in Figures 14 and 19 are in millimetres.

The apparatuses shown in the drawings may be modified to include means (not shown) for placing advertising material in the chamber 12 or mould 16 so that the advertising material can be viewed in or on the drinking vessel after moulding. Advertising material can take the form of a tab carrying a logo or a brand of a chosen company. The advertising impact could be enhanced by introducing dyes or pigments to the ice to match those of the logo or brand. Alternatively or in addition, the mould 12 may be formed with a relief pattern in the shape of the logo or brand. As indicated, any one of a plurality of differently shaped moulds 16 can be used with the apparatus allowing shapes for a drinking vessel unique to a particular brand.

Key to Figures 9 to 19

Figure 9

40	-	flake ice machine (size 450 x 450 x 450 mm)
42	-	refrigerated storage bin (size 300 x 450 x 450 mm)
44	-	moulding unit
46	-	bar top

Flake ice is produced using a conventional flaker. The ice travels upwards and is stored in the refrigerated bin.

Figures 10 and 11

When needed the ready-made ice can be transported to the moulding chamber using a reciprocating rotating screw 48 via a feed pipe 56.

Figure 12

Flake ice falls into the moulding chamber 50 and into mould 52 through aperture 54. The male part 58 of the mould moves downwards compacting the ice.

Figure 13

The male part 58 moves upwards.

Figure 14

The outer mould 52 moves upwards to allow the vessel to be removed.

Figure 15

This produces ice drinking vessels.

Moulding unit 44 is 400 mm in height and 210 mm in width.

Figure 17

The male mould part 58 is shown above the outer mould 52.

Figure 18 and 19

The finished drinking vessel 60 is revealed when the outer mould 58 moves up. It can be removed from the moulding chamber.

CLAIMS

1. Apparatus for making a drinking vessel from ice, comprising: a chamber for receiving ice; compacting means for compacting ice in the chamber into a mould for a drinking vessel; and a mould fitting for fitting a mould in position to receive ice from the chamber.

2. Apparatus as claimed in claim 1 wherein the mould fitting can fit any one of a plurality of differently shaped moulds in position to receive ice from the chamber.

3. Apparatus as claimed in claim 1 or claim 2, further comprising a mould for a drinking vessel.

4. Apparatus as claimed in any one of the preceding claims, further comprising means for ejecting a drinking vessel from the apparatus after moulding.

5. Apparatus as claimed in any one of the preceding claims, wherein the compacting means comprises a piston mounted for sliding movement in the chamber, movement of the piston in a first direction compacting ice in the chamber into a mould for the drinking vessel.

6. Apparatus as claimed in claim 5 when dependent on claim 4, wherein the ejecting means are triggered by movement of the piston in an opposite direction.

7. Apparatus as claimed in any one of the preceding claims, wherein the chamber is connectable to a feed of an ice maker whereby ice can be deposited in the chamber on demand.

8. Apparatus as claimed in claim 7 when dependent on claim 5, wherein movement of the piston in an opposite direction triggers feeding of ice into the chamber.

9. Apparatus as claimed in any one of the preceding claims, further comprising means for introducing advertising material into the chamber or mould so that the advertising material can be viewed in or on the drinking vessel after moulding.

10. Apparatus as claimed in any one of the preceding claims, further comprising an ice maker.

11. Apparatus as claimed in any one of claims 1 to 9, further comprising a flaked ice maker.

12. Apparatus for making a drinking vessel from ice, comprising: an outer mould for receiving ice; an inner mould for compacting ice in the outer mould to form a drinking vessel; and means for moving the inner mould relative to the outer mould.

13. Apparatus for making a drinking vessel from ice substantially as hereinbefore described with reference to Figures 2 to 6; Figures 7 and 8; or Figures 9 to 19.

14. A method of making a drinking vessel from ice comprising the steps of: placing ice into a chamber; compacting the ice in the chamber into a mould to form a drinking vessel; and removing the drinking vessel from the mould.

15. A method as claimed in claim 13 wherein the ice that is used is flaked ice.

16. A method as claimed in claim 14 wherein the drinking vessel is formed by regelation.

17. A method for making a drinking vessel from ice substantially as hereinbefore described with reference to Figures 2 to 6; Figures 7 and 8; or Figures 9 to 19.

Application No: GB 0102367.0 **Examiner:** M C Monk
Claims searched: All **Date of search:** 16 August 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): F4H (HD7A)

Int Cl (Ed.7): F25C (5/14)

Other: ONLINE DATABASES: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 5786004	KEIJIRO YAMAUCHI Automatic ice crusher (61), chute box (31), female die (11), male die (21); see especially Fig.8(B).	1,3,4,7, 10-12, 14,15
X	US 5752394	KEIJIRO YAMAUCHI Ice crusher (1), female dies (12), plurality of male dies (15); ice vessels (A); see Fig.4.	1,3,4,7, 10-12, 14,15
X	US 5634344	KEIJIRO YAMAUCHI Automatic ice crusher (61), chute box (31), female die (11), male die (21); see especially Fig.9(B). See Fig.17.	1,3,4,7, 10-12, 14,15
X	EP 0595447 A2	KABUSHIKI KAISHA YAMANOUCHI SEISAKUJYO Chute box (31) for crushed ice, female die (11), male die (21);	1,3,4,7, 10-12, 14,15

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.