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ICE CUBE EJECTOR MECHANISMS

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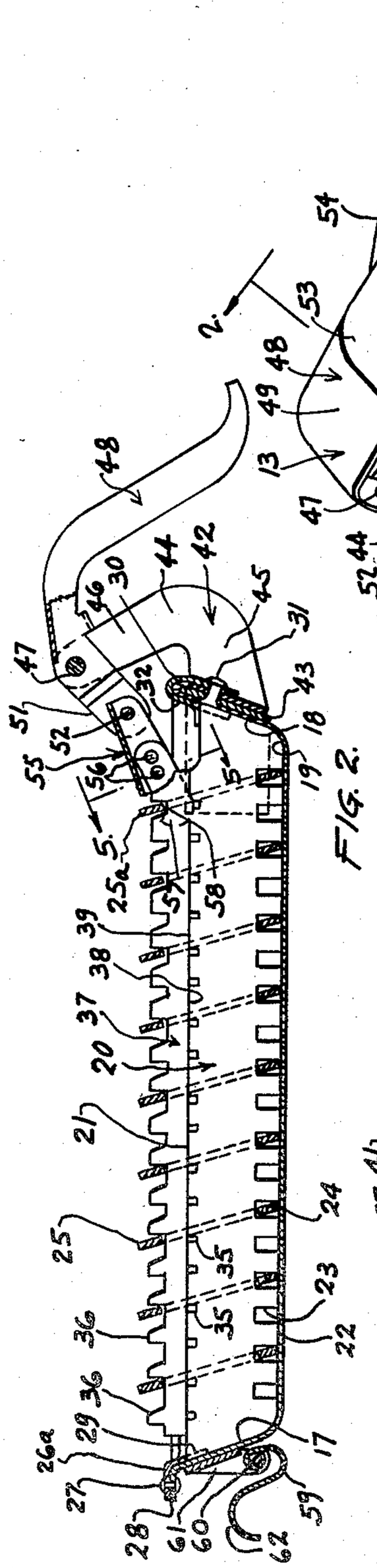

FIG. 2.

FIG. 1.

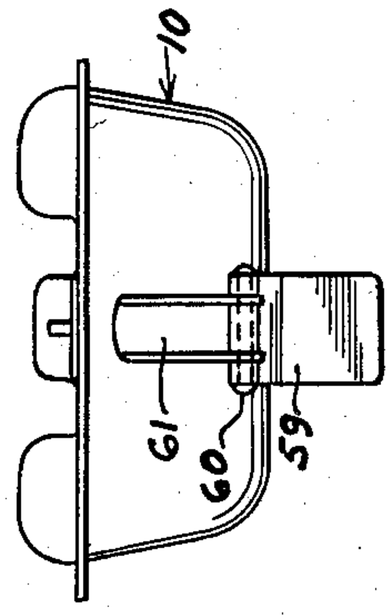

FIG. 4.

FIG. 3.

FIG. 5.

FIG. 6.

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ICE CUBE EJECTOR MECHANISMS

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1 Claim. (Cl. 62—365)

The present invention relates to ice cube ejector mechanism and is particularly concerned with the provision of an improved ice cube ejector mechanism adapted to facilitate the ejection of ice cubes by the manipulation of a handle which is accessible from the forward end of the ice cube tray at all times.

One of the objects of the invention is the provision of an improved ice cube ejector mechanism in which the ice cubes are frozen in a tray having a movable grid that is permanently secured in the tray so that the tray may be inverted and the ejector mechanism actuated to cause the cubes to fall into an ice cube bin without dropping the grid.

Another object of the invention is the provision of an improved ice cube ejector mechanism in which the ice tray is provided with a grid having a longitudinal divider plate secured in the tray and a multiplicity of transverse webs forming molded recesses for forming ice cubes and a longitudinally extending connecting rod strip which actuates all of the webs from an inclined position toward a vertical position to break the bond between the ice cubes and the walls of the tray and grid, and to release the cubes from the tray and grid.

Another object of the invention is the provision of an improved ice cube tray and grid of class described having movable grid parts which loosen the ice cubes and having a longitudinally protruding lever which extends outwardly from the front of the ice tray in position to be accessible to the user when the tray is located in the evaporator or in a shucking position, so that the lever may actuate the movable parts of the grid to release the ice cubes into an ice cube bin.

Another object of the invention is the provision of an improved lever actuated shucking mechanism including a lever mounted upon an upwardly extending bracket and connected by one or more connecting links to the grid webs which, in turn, are connected to each other by an elongated actuating strip, the webs being moved to shucking position when the lever is moved upward in upright position so that a downward force may be used on the lever to discharge the cubes when the tray is in the inverted position.

Another object of the invention is the provision of an improved ice cube ejector mechanism including a grid having a longitudinal divider plate and a multiplicity of transverse webs in which the divider plate is provided with laterally projecting portions for supporting the webs in an inclined position and in which an elongated actuating strip is provided with actuating shoulders, each of which is spaced a slightly greater distance from its web

so that the webs are not actuated simultaneously but successively to loosen ice cubes from the grid and to discharge them one after another into the ice cube bin.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings accompanying the specification,

Fig. 1 is a fragmentary view in perspective of an ice cube ejector tray embodying the invention;

Fig. 2 is a vertical sectional view taken on the plane of the line **2—2** of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a fragmentary sectional view taken on the plane of the line **3—3** of Fig. 1, looking in the direction of the arrows;

Fig. 4 is an end elevational view taken from the left end of Fig. 2;

Fig. 5 is a fragmentary sectional view taken on the plane of the line **5—5** of Fig. 2, looking in the direction of the arrows;

Fig. 6 is a fragmentary sectional view taken on the plane of the line **6—6** of Fig. 3, looking in the direction of the arrows.

Referring to Figs. 1 and 2, **10** indicates in its entirety the ice cube ejector tray and mechanism which preferably includes an aluminum ice tray **11**, a grid assembly **12** and an actuating mechanism assembly **13**.

The tray **11** has a rectangular bottom **14** and outwardly diverging side walls **15** and **16**, and outwardly diverging end walls **17** and **18**. The walls are joined to the bottom by an easy bend **19** in each case. This structure facilitates the discharge of the ice formed in the tray because of the fact that the ice will taper to a smaller size at the bottom of the tray.

The grid assembly **12** preferably includes a longitudinally extending division plate **20** of aluminum and of a shape complementary to the longitudinal inside section of the tray but narrower than the depth of the tray having its upper edge at **21**.

The division plate **20** is preferably provided along its lower edge **22** with a multiplicity of rectangular slots **23**, large enough to receive the lower portion **24** of each web **25**, which is left after forming the through aperture **26**. In each web, the divider plate **20**, which happens to be shown in Fig. 2, may be used with double the number of webs employed in Fig. 2, if it is desired to make narrower ice cubes.

The divider plate **20** is preferably secured in the tray **11** by a metal clip **26***a* at the left end which has an attaching flange that is riveted at **27** to the end flange **28** of the tray.

Clip **26***a* is forked and has each of its legs **29** located on one side of the division plate **20** holding the division plate downward, and preventing its lateral movement.

At the other end the division plate **20** is also held downward by a second U shaped clip **30** secured by a rivet **31** to the end wall **18** and having a slot to provide two legs **32** that engage the division plate **20** to hold it down and prevent lateral movement.

The tray **11** preferably provided on the upper edges of its side walls **15, 16** with the laterally projecting flanges **33, 34** adapted to rest on suitable guides of an ice cube bin with the tray inverted so that the ice cubes may be

shucked or ejected with the tray in the inverted position.

The division plate **20** is provided with a multiplicity of outwardly pinched tongues **35**, Fig. 6, one for each transverse web **25** to give the webs support in the position shown in Fig. 2 which they assume during the freezing of cubes. Were it not for these lugs **35**, the webs might tilt even farther since they are not supported against tilting by upwardly extending lugs **36** on the actuator strip **37** for a reason further to be described.

The actuator strip **37** comprises a narrow strip of the same thickness as the division plate **20**, having a multiplicity of upwardly extending lugs **36** for engaging the webs **25**. It happens that the actuating strip **37**, as shown, has twice the number of lugs **36** needed, permitting the use of twice as many webs, if desired.

The lower edge **38** of the actuating strip **37** slides on the upper edge **39** of the divider plate **20** and both strips are located in the apertures **26** of all of the webs **25**.

In order that the actuator strip **37** may be placed beside the divider plate **20** during the assembly to cause the lugs **36** to clear the upper edge **40** of apertures **26**, these apertures **26** are made wider at **41** over an area sufficient to receive the actuator strip **37** plus its lugs.

The ice tray **11** is provided with a bracket **42** at its right end which may be said to be of U shape, since it has a yoke **43** that is riveted at **31** to the end wall **18** and it has two upwardly extending legs, **44** which extend outwardly from the pan at **45** and upwardly at **46**.

This locates the pivot end of the bracket legs **44** above the edge of wall **18** for supporting the pivot rivets **47**. The actuating mechanism **13** includes a handle **48** which is substantially U shaped in cross section, having a body **49** and side flanges **50** which increase its strength.

The side flanges **50** are pivoted with rivets **47** to the legs **44** of bracket **42**. The handle **48** has a pair of bell crank extensions **51** that extend below the pivot **47** and are provided with a transverse riveted pin **52**.

The outer end of handle **48** is bent downward at **53** and is curved outward again at **54** to dispose of the required length of the handle for the desired leverage without making the assembly too long.

Pin **52** on handle **48** supports a connecting link **55** which is U shaped in cross section and has its depending flanges provided with apertures for pin **52**. The link **55** may have a pair of transverse rivets **56** passing through registering apertures in a pair of hooks **57**.

Hooks **57** comprise short metal plates located on opposite sides of the actuating strip **37** in an enlarged or wider aperture **58** for the end web **25***a*. The hooks extend upwardly at their end portions **58**, so that they cannot get out of the apertures **58** when properly located and riveted to the link **55**.

59 indicates a short prying lever mounted on a rivet **60** carried by bracket **61** on the other end of the tray, so that the user may push it down on curved portion **62** to pry the tray loose.

With the present mechanism the pry need not be employed, since the handle itself is large enough to permit the breaking of the tray from the surrounding ice on the evaporator. The method of operation of the present ice cube ejector tray is as follows.

The parts are arranged in the position of Fig. 2. The tray is filled with a measured supply of water from a spout controlling the water supply so that there will be no spilling.

The evaporator is preferably maintained about a temperature of 0° F., so that the water is quickly frozen into cubes. The tray is then lifted from the evaporator by means of the handle **48**. It is inverted and placed on an ice cube bin having upper side walls for engaging the flanges **33**, **34** on the tray, or having suitable guides for this purpose.

The handle is then pushed downward with the tray in the inverted position causing the legs **51** of the handle to move to the right in Fig. 2, pulling on the link **55** and the hooks **57**. The hooks **57** actuate the first transverse web **25***a* which pulls on the actuating strip **37**.

The first web pivots from diagonal position toward a vertical position tending to break the bond with the ice cube located in advance of this web and tending to squeeze the ice cubes upwardly.

Since the legs **36** are successively located farther to the left of each web on the actuating strip **37**, this actuating strip has its lugs **36** successively brought into engagement with the webs **25** beginning on the right hand side and breaking out the cubes in succession, one after another.

The advantage of this is that it requires less force to loosen one cube. The present mechanism is, therefore, adapted to loosen the cubes one after another using a minimum amount of force. If some of the cubes still remain in the tray, the handle may be moved back and forth a few times which will certainly release them all.

Then the mechanism is moved back to the position of Fig. 2 where the lugs **35** and the lower slots **23** hold the transverse webs **25** all at the same angular tilted position. The tray may then be placed right side up in the evaporator and filled again. The cubes may be harvested as they become frozen.

It will, thus, be observed that we have invented an improved ice cube tray and shucker mechanism which only requires the inversion of the tray over an ice cube bin and the forcing down of the actuating lever. This draws all of the dividing webs from a diagonal position to a vertical position, accomplishing this successively, so that only one web has its cube broken loose at once.

A minimum amount of force is required as distinguished from the levers for releasing ice cubes in the prior art, where the levers are customarily folded over the grid.

The present actuating mechanism projects from the front of the tray and is accessible to the user for shucking the ice cubes, even when the tray itself has been inserted upside down into a recess above a bin.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

An ice cube tray of the ejecting type adapted to be actuated by a lever extending forwardly out of an evaporator, comprising a metal tray having a bottom, side walls, and end walls, the walls being shaped to slope upward and outward, a metal grid permanently mounted in said tray, and comprising a longitudinally extending partition, a metal clip riveted to one end wall of the tray, and having a split retaining flange in the tray, engaging both sides of the partition to secure the partition at this end, a U shaped clip at the other end of the tray embracing the end wall and riveted thereto, and split into legs inside the tray, engaging both sides of the partition to secure it at the other end, a plurality of apertured cross plates receiving said partition in their apertures and tiltable thereon to form a grid with movable cross plates, an actuating strip above said partition and located in the same apertures in the cross plates, and having lugs for engaging and tilting the cross plates, a U bracket carried by the other end of the tray, on the outside of its end wall, and secured by said U shaped clip and rivet, said U bracket having an upwardly and inwardly extending pair of pivot flanges located above the rear end wall of the tray, a wide lever having depending pivot flanges pivoted on said pair of pivot flanges of said bracket, said lever having its inner end pivotally connected to said actuating strip by a link and a hook, and said lever having a wide, flat actuating end, extend-

ing outwardly from said tray to be accessible for ejecting cubes when the tray is inverted and housed in an evaporator, said lever being adapted to exert a pull on the actuating strip to tilt the cross plates to loosen and eject the ice cubes.

References Cited in the file of this patent

UNITED STATES PATENTS

1,879,400	Mitchell	Sept. 27, 1932
2,217,681	Jennings	Oct. 15, 1940
2,342,670	Jennings	Feb. 29, 1944
2,342,860	Hedlund	Feb. 29, 1944
2,362,320	Steenstrup	Nov. 7, 1944
2,454,960	Berkeley	Nov. 30, 1948
2,622,410	Roberts	Dec. 23, 1952
2,701,453	Henderson	Feb. 8, 1955
2,714,294	Frei	Aug. 2, 1955
2,752,762	Gaugler	July 3, 1956
2,757,520	Sampson	Aug. 7, 1956
2,809,499	Frei	Oct. 15, 1957