United States Patent

[11] 3,624,703

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[21] Appl. No. 882,632
[22] Filed Dec. 5, 1969
[45] Patented Nov. 30, 1971
[73] Assignee Whirlpool Corporation

[54] ICEMAKER CUTTER-GRID-MOUNTING MEANS
14 Claims, 6 Drawing Figs.

[52] U.S. Cl. 62/298, 62/320, 248/239, 287/350, 62/348
[51] Int. Cl. F25d 19/00, F25c 1/00
[50] Field of Search 62/348, 347, 298, 320; 211/134, 153; 192/302; 248/239, 243; 312/333, 334, 350; 287/189-235

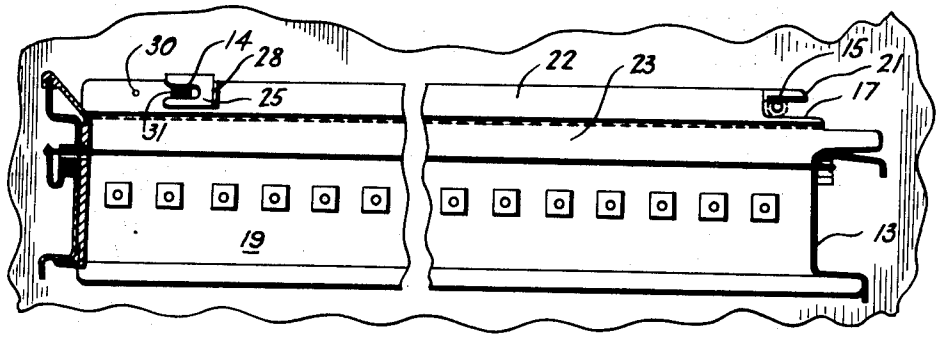
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ABSTRACT: Apparatus for releasably mounting a subdividing heated wire grid in the cabinet of an icemaker in which a slab of ice is formed and this slab transferred to the slab dividing grid all within the cabinet. This invention includes improved means including interengaging projections and projection receiving means such as slots together with movable catches for some of the slots with the result that the interengagement of the projections and slots provides effective but easily released mounting means for positioning the subdividing grid in the cabinet. The invention is particularly useful for large commercial icemakers in which there is located a plurality of the ice slab forming means positioned closely together vertically and in which the subdividing means or heated grid is located closely adjacent each vertical pair of slab forming means which in each instance is usually a refrigerant evaporator plate.



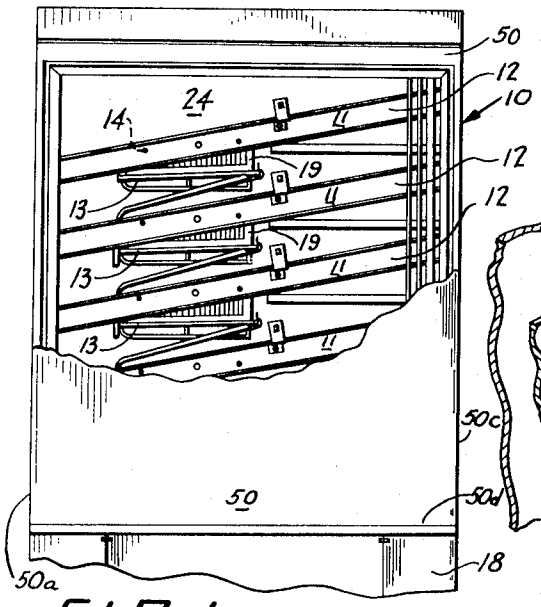


FIG. 1

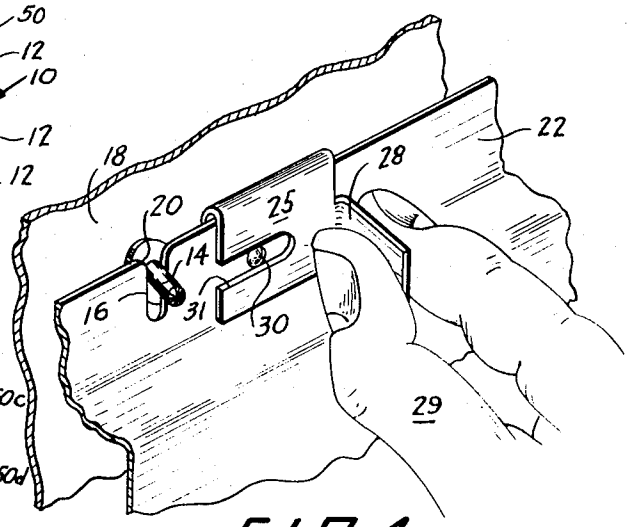


FIG. 4

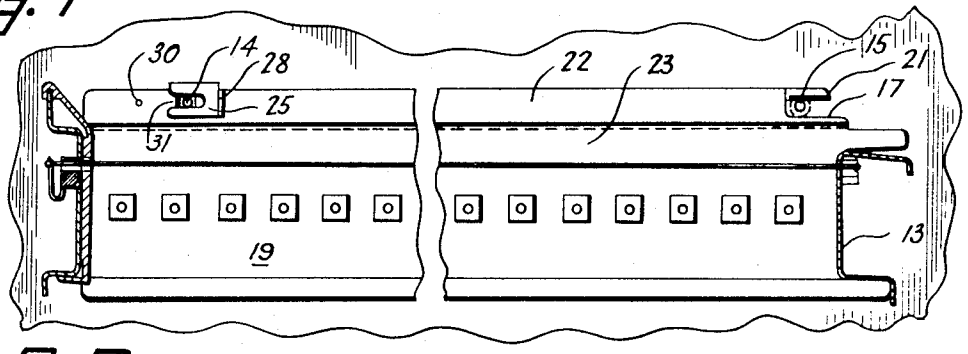


FIG. 2

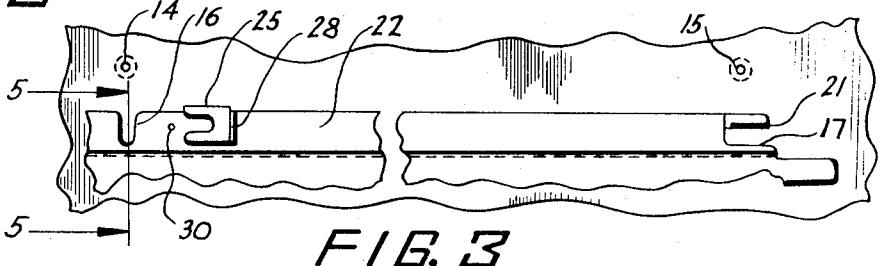


FIG. 3

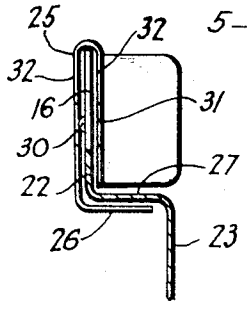


FIG. 5

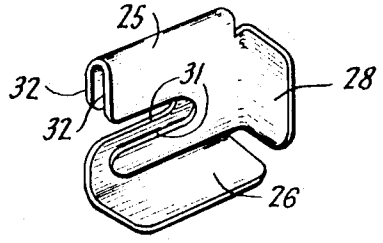


FIG. 6

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ICEMAKER CUTTER-GRID-MOUNTING MEANS

One of the features of this invention is to provide an improved apparatus for releasably mounting a subdividing means in an icemaker cabinet so that the subdividing means, usually an electrically heated grid, may be readily fixed in position within the cabinet and removed as for servicing even though the space available is quite small and without requiring tools such as wrenches, screwdrivers or the like.

Other features and advantages of the invention will be apparent from the following description of one embodiment thereof as illustrated in the accompanying drawings. Of the drawings:

FIG. 1 is a front-elevational view of a commercial icemaker cabinet having ice slab subdividing means therein embodying the invention and with portions of the front door of the cabinet broken away for clarity of illustration.

FIG. 2 is a vertical-sectional view illustrating the releasable mounting apparatus on one side of the subdividing grid with this apparatus being shown in elevation.

FIG. 3 is a view similar to the top portion of FIG. 2 but illustrating the mounting apparatus in partially released position.

FIG. 4 is an enlarged fragmentary perspective view illustrating the procedure for operating the releasable mounting apparatus.

FIG. 5 is an enlarged fragmentary vertical-sectional view taken substantially along line 5—5 of FIG. 3.

FIG. 6 is a perspective view of a slidable catch on the mounting apparatus.

The icemaker **10** illustrated in FIG. 1 is similar to the icemaker of Ayres et al. U.S. Pat. No. 2,682,155, issued June 29, 1954 and owned by the assignee of the present application. Such an icemaker has been widely accepted as an efficient apparatus for making large amounts of ice cubes automatically and continuously. In such an icemaker the ice is formed by flowing water over an evaporator plate to produce an ice slab which is then released from the plate and permitted to fall into a subdividing means usually in the form of a heated electric resistance wire grid formed of wires heated to a sufficient temperature to melt and subdivide the slab into cubes.

In the icemaker **10** illustrated in FIG. 1 there are provided a plurality of inclined vertically spaced rails **11**. These rails are spaced vertically from each other but are positioned close together as shown so that a large number of ice cubes may be formed simultaneously. The upper portions **12** of the rails support evaporator plates (not shown) that are inclined to substantially the same angle as the rails **11**, as illustrated.

After the ice slabs have been formed they are released in the well-known manner and permitted to slide from the evaporator plates onto subdividing means or cutting grids **13** positioned beneath the lower ends of the parallel rails **11**. In order to aid in removing each cutting grid **13** as desired as when servicing or cleaning or for any other reason each grid is provided with improved releasable mounting means.

The releasable mounting means for each grid **13** comprises a plurality of interengaging projections here shown as pins **14** and **15** and projection receiving means here shown as slots **16** and **17**. The pins are located on the backwall **24** of the cabinet **18** of the icemaker **10** and on the inside (not shown) of the rails **11**, and the slots are located on the frame of the grid **13** with this frame being a rigid structural member here shown as the sheet metal periphery of the grid **13**.

As can be seen from the drawings each slot **16** has an entrance **20** while each slot **17** has an entrance **21**. The slots **16** and **17** are located adjacent opposite ends of side parallel flanges **22** that extend upwardly from the front and rear sides **23** of the cutting grid frame **19**. The rear side parallel flange **22**, illustrated in FIGS. **2–5**, is adapted to be located against the backwall **24** of the cabinet **18**. The front side parallel flange, which is not shown since it is substantially the same as rear flange **22**, is adapted to be located against the inside of the rails **11**. In the illustrated embodiment the pairs of pins **14** and **15** extend inwardly of the cabinet from wall **24** and from the rails **11**.

As shown the end slot **16** on each of the pair of flanges **22** is located adjacent a corresponding end of its flange and extends in a generally vertical direction. Each corresponding opposite slot **17** is at the other end of its flange **22** and extends essentially horizontally.

In order to releasably retain the subdividing means or grid in position in the cabinet **18** there are provided movable means for closing each entrance on a first set of projection-receiving means to prevent removal of the corresponding projections therefrom with the others of the receiving means including their entrances being unparallel to the first set of projection-receiving means to block release of all the projections from the receiving means when the first set entrances are closed by the movable means. In the illustrated embodiment the first set of projection receiving means comprises the vertical slots **16** on the opposite side flanges **22**. The others of the receiving means or slots are the opposite end slots **17** which are unparallel to the slots **16** in that slots **17** are horizontal.

The movable means for closing the entrances **20** to the first set of slots **16** comprises a catch **25** for each slot **16** slidably mounted on a flange **22** adjacent its slot **16**. Each catch **25** as is illustrated most clearly in FIG. **6** includes an inwardly extending lip **26** adapted to underlie a horizontal portion **27** that interconnects the top of the cutter frame side **23** and the outwardly located upwardly extending flange **22**. Each catch also includes an inwardly extending handle **28** adapted to be engaged by the hand **29** of the operator for sliding the catch along its flange **22**. The catches mounted on the front side, parallel flange of grid **13**, are not shown since they are mirror images of the catches **25**.

Each flange **22** in the region adjacent a slot **16** is deformed as illustrated by a pair of dimples **30** or embossments so as to provide a friction resistance to the movement of the catch **25** as illustrated in FIG. **2**. The detents retain the catch in a desired ready for assembly position during shipment of the grid **13**. When each catch is in this pin locking position of FIG. **2** the pin **14** is retained in a pair of horizontal slots **31** in the opposite sides **32** of the catch. As illustrated, these opposite sides **32** are located against the opposite side surfaces of flanges **22** so that opposite side surfaces actually provide bearing surfaces for the movable catch. Although grid **13** is slightly inclined as shown in FIG. **1**, the catches **25** and their mirror images adjacent the front of the cabinet are positively prevented from sliding off the lower ends of the flanges **22** due to vibrations caused by icemaker operation since the bight portions of the slots **31** will bear against the right side of pins **14** as indicated in FIG. **2**. This would not be possible if the catches mounted on the front side parallel flange of grid **13** were not mirror images of the catches **25**.

As described above, the subdividing means structural member **19** is a part of the peripheral frame of the grid means or cutting grid **13**. A pair of opposite parallel sides **23** of this frame member are bent outwardly as shown at **27** and then upwardly to provide the mounting flanges **22**. Then at one corresponding end of each flange **22** are located the vertical slot **16** and its slidable catch **25** while at the other end of each flange **22** is located the inwardly extending horizontal slot **17** with its entrance end **21** at the extreme end of the flange.

In mounting each of the plurality of cutting grids **13** in the narrow space available between each pair of vertically adjacent rails **11** it is only necessary to manipulate the grid **13** to locate the pins **15** at the inner ends of their horizontal slots **17** and to manipulate the grid so that the other set of pins **14** are located at the bottom of their slots **16**. This can all be done quite easily as the grids are lightweight. With the pins in these positions in their slots it is then only necessary to grasp each catch **25** by its handle **28** and move the catch to the left, as shown in the drawings, so that each pin **14** is received in the opposite side slots **31** of the catch as shown. The cutting grid **13** is then securely locked in position as the catches **25** hold each grid at one end and the horizontal arrangement of the opposite slots **17** prevents removal of the other pins **15** therefrom.

The cabinet **18** is provided with a hinged door **50** to afford easy access for service or cleaning of the interior or the cabinet. Door **50** is hinged about a vertical axis adjacent the left edge **50***a* of door **50**. The top, right edge, and lower edge of door **50** are identified by reference numerals **50***b*, **50***c*, and **50***d*, respectively. In the event it becomes necessary to remove a grid from the cabinet as for servicing, cleaning or the like, it is only necessary to open the door **50** by pulling on right edge **50***c* to obtain access to the interior of cabinet **18**, and then hold the grid with one hand while moving the two opposite catches **25** to release positions or to the right as shown in the illustrated embodiment so that the left-hand end of the grid can be lowered to disengage its slots **16** from their pins **14** and then move the grid to the left to disengage the other pins **15** from their horizontal slots **17**.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. In an icemaker having a cabinet, ice-slab-forming means, and subdividing grid means for subdividing an ice slab into smaller portions, said subdividing means including a structural member, apparatus for releasably mounting said subdividing means in said cabinet, comprising: a plurality of interengaging projections on said cabinet and projection-receiving means on said structural member, each said receiving means having an entrance for receiving its interengaged projection; and movable means movably carried on said structural member adjacent a first set of said projection receiving means gravitationally biased to close the entrance thereof to prevent removal from the projection-receiving means of corresponding projections received therein, the others of said receiving means having their entrances opening unparallel to those of said first set to block release of all said projections from their receiving means when said first set entrances are closed by said movable means, said movable means including means for supporting the subdividing grid means from said projections.

2. The apparatus of claim **1** wherein each said receiving means comprises an elongated slot means having an open end comprising said entrance.

3. The apparatus of claim **1** wherein said movable means comprises a catch having a closure portion and a stop shoulder, said catch being slidable on said structural member to dispose the said closure portion across said entrance and said stop shoulder in abutment with the projection received therein to limit the gravitational movement of the catch downwardly to the entrance-closing disposition.

4. The apparatus of claim **1** wherein said structural member comprises a peripheral frame member of said grid means.

5. The apparatus of claim **1** wherein said mounting structural member comprises a peripheral frame member on said grid means, and each said receiving means comprises an elongated slot means in said frame member having an open end at an edge of the frame member.

6. The apparatus of claim **5** wherein said movable means comprises a catch movable on said frame member to a position extending across a said entrance, and means for releasably retaining said catch spaced from the said entrance during installation and removal of said grid means relative to said cabinet.

7. The apparatus of claim **6** wherein each said catch is provided with a handle portion extending inwardly of said peripheral frame member.

8. The apparatus of claim **1** wherein said subdividing means has a rectangular periphery defined by a pair of flanges on a pair of opposite sides, each flange having an exposed edge and ends, and each said receiving means comprises a slot in said flange adjacent an end thereof, the slots at one end of said subdividing means extending inwardly of said flange edges and the slots at the opposite end of said flanges extending inwardly of a flange end.

9. The apparatus of claim **8** wherein each of said flanges is provided with a slidable catch having a retaining portion adapted to extend over a slot to retain the corresponding projection therein.

10. The apparatus of claim **3** wherein said movable means comprises a pair of mirror image catches slidable to positions extending across said entrances at opposite sides of the structural member.

11. In an icemaker including a cabinet and subdividing means in said cabinet defined by a heated wire grid carried by a peripheral structural member for subdividing an ice slab delivered onto said grid, structure for selectively mounting said subdividing means comprising:

first support means for providing a first support of said subdividing means; and second support means for providing a second support of said subdividing means including

means on said structural member defining an upwardly opening slot,

projection means fixedly on said cabinet positioned to be received respectively in said slot by a movement of said subdividing means relative to said projection means, and

means cooperating with said projection means and said first support means to support said subdividing means at an angle to the horizontal including locking means slidably carried on the subdividing means gravitationally biased downwardly therealong for selectively overlying the projection means in said slot and including means for engaging the projection means to provide said second support of the subdividing means and to limit the gravitational downward movement of the locking means to said overlying relationship.

12. The mounting structure of claim **11** wherein said locking means comprises a pair of mirror-image-locking elements mounted on said structural member at opposite sides thereof and said mounting structure includes a pair of slots, one each in said opposite sides.

13. The mounting structure of claim **12** wherein said locking means includes a fingertip manipulating portion extending inwardly of said peripheral structural member.

14. The mounting structure of claim **13** further including detent means for releasably holding said locking means spaced from said slot as during installation and removal of the subdividing means relative to the projection means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,624,703 Dated November 30, 1971

Inventor(s) GEORGE E. PAVEK

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 5, column 3, line 53, cancel "mounting".

Signed and sealed this 30th day of May 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents