Feb. 7, 1950 M. K. BUCHANAN 2,496,331

ICE CUBE TRAY

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Fig. 1.

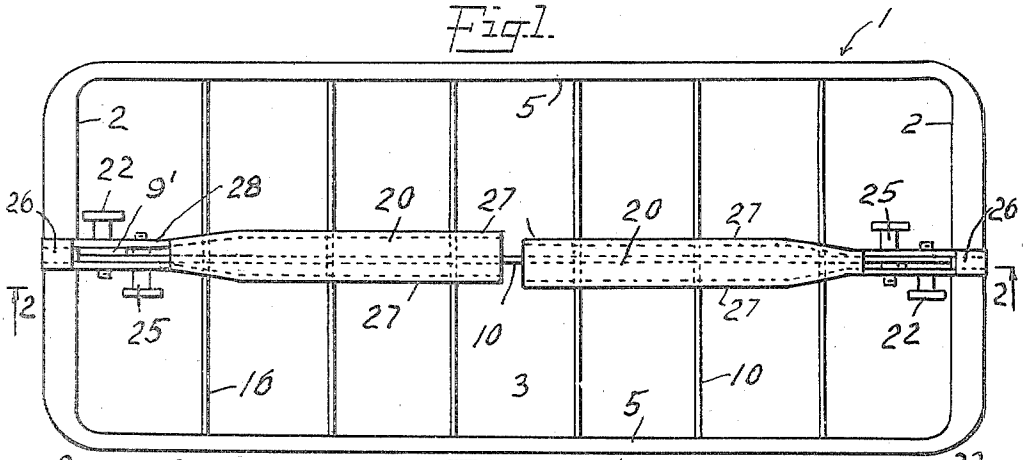


Fig. 2.

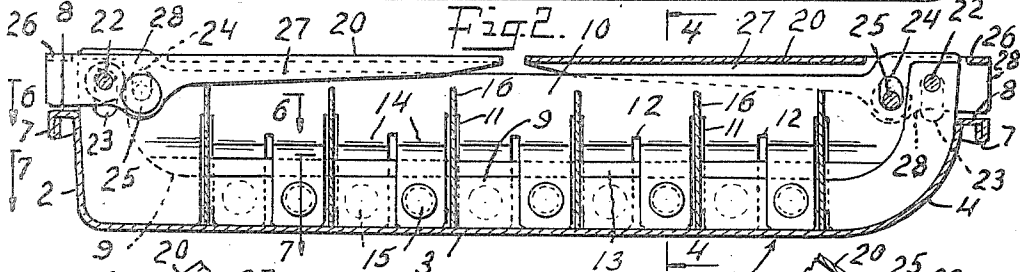


Fig. 3.

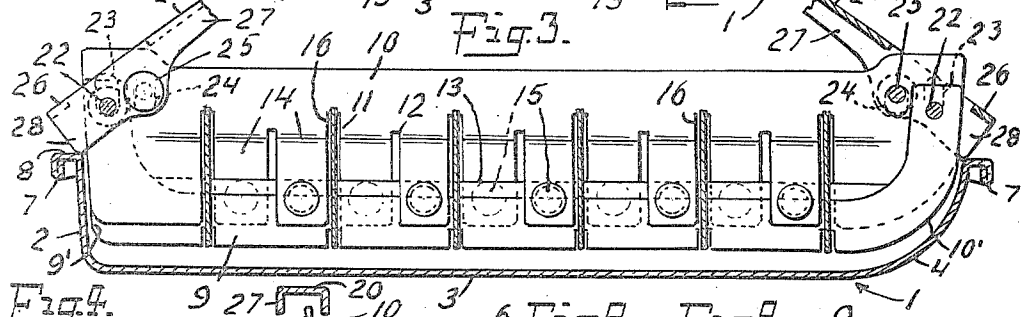


Fig. 4.

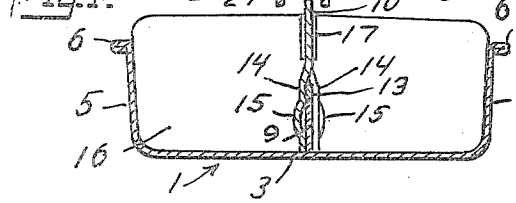


Fig. 5.

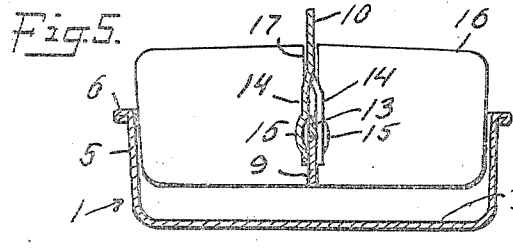


Fig. 9.

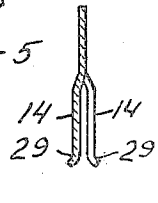
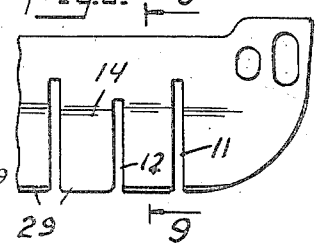


Fig. 8.



INVENTOR
MICHAEL K. BUCHANAN
BY
Pennie, Edmonds, Morton & Barrows
ATTORNEYS

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Fig. 6.

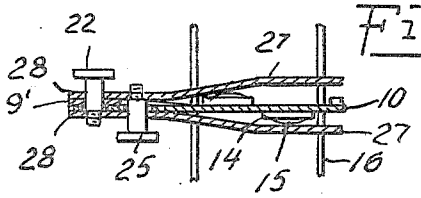


Fig. 7.

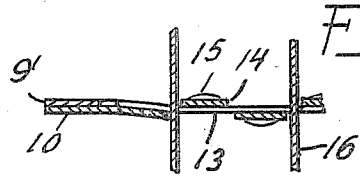
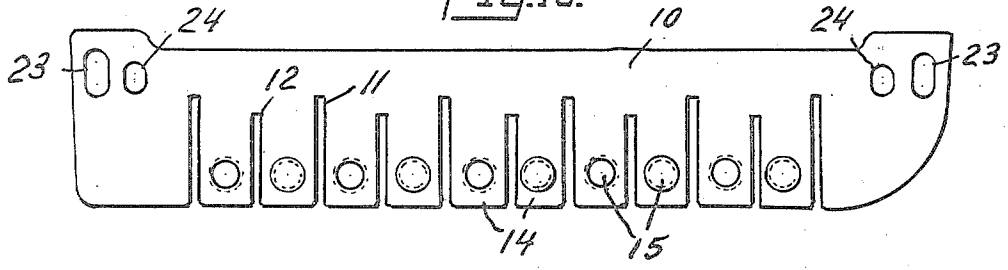


Fig. 10.



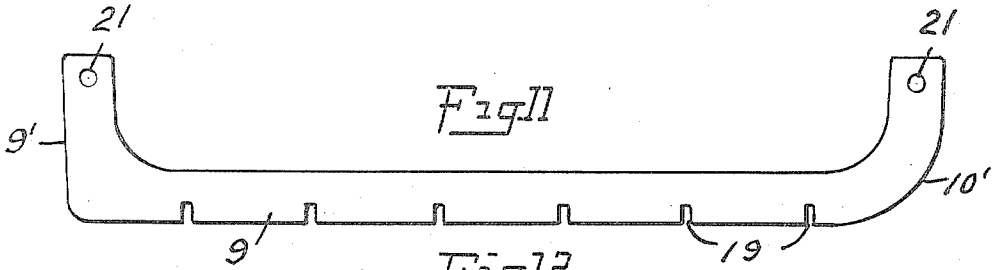
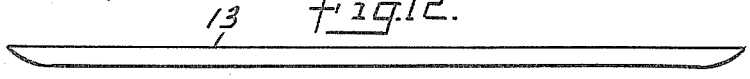


Fig. 12.



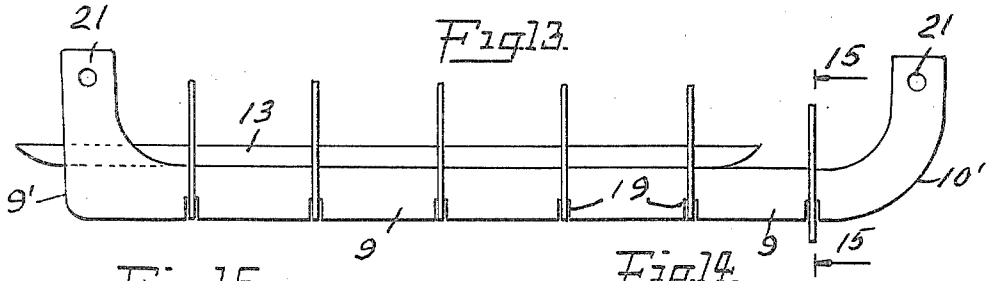


Fig. 15.

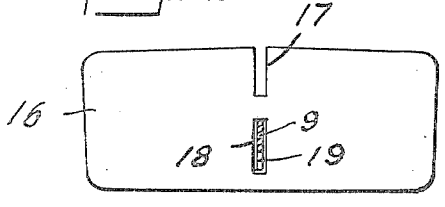
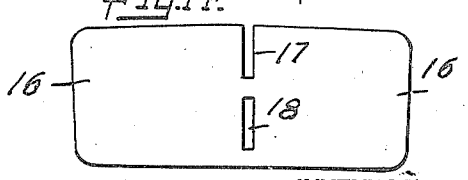


Fig. 14.



INVENTOR
MICHAEL K. BUCHANAN
BY
Pennie, Edmonds, Morton & Barrows
ATTORNEYS

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UNITED STATES PATENT OFFICE

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ICE CUBE TRAY

Michael K. Buchanan, Norfolk, Va.

Application February 5, 1947, Serial No. 726,655

9 Claims. (Cl. 62—108.5)

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This invention relates to ice trays and more particularly to an improved construction of an ice tray having means for releasing the ice cubes from the pan and from the grid.

In my prior Patent 1,893,535, granted January 10, 1933, I have disclosed an ice tray comprising a pan and a grid provided with means for raising the grid in the pan to release the grid and the cubes, frozen thereto, from the pan. In the construction disclosed in that patent the grid is rigid and the cubes therefore remain bonded to the grid when the cubes and grid are released from the pan.

In Reissue Patent 18,819, granted on May 2, 1933 to Albert G. Horton and me, there is disclosed an improvement over my earlier patent in which the grid is made in two relatively movable parts and in which means are provided for raising one of the parts of the grid. This results not only in releasing the grid and the cubes from the pan but also in releasing the cubes from the grid.

The device of the present invention is an improvement over the devices of the two prior patents. In the development of ice trays, various means have been provided for releasing the cubes from the pan and the grid, such means usually including a grid consisting of relatively movable parts. In some of these devices the leverage obtainable is not sufficient for breaking the bond between the cubes and the pan and grid and in other devices the initial movement of a part of the grid is too abrupt resulting in shattering of the ice cubes.

In the present invention I have provided an improved construction for releasing the cubes from the pan and the grid in which a minimum of force is required and in which the cubes are released without shattering. In carrying out the invention I provide a pan of conventional construction and a grid member. The grid member consists of a pair of longitudinal members and a plurality of cross members or fins. An operating lever is secured to the longitudinal members adjacent each end and these levers are provided with toes or extensions overlapping the upper edge of the pan. When the levers are swung on their pivots, the entire grid structure is raised in the pan. Further movement of the levers causes relative movement of the two longitudinal grid members. The upper longitudinal member is provided with extensions which overlie the opposite sides of the lower member and these extensions are provided with offsets or projections which cause the cubes to be moved laterally

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of the pan as the upper member is moved relatively to the lower member, releasing the cubes from the grid.

The herein disclosed construction provides a tray from which ice cubes can be readily removed and in which the cubes are not shattered or broken when released.

In the accompanying drawing I have shown several embodiments of the invention. In this showing:

Fig. 1 is a plan view of the tray with the parts in the normal position occupied during freezing of the cubes;

Fig. 2 is a vertical, sectional view on line 2—2 of Fig. 1;

Fig. 3 is a similar view showing the grid in raised position;

Fig. 4 is a vertical, sectional view on line 4—4 of Fig. 2;

Fig. 5 is a similar view with the grid in raised position;

Fig. 6 is a detailed, sectional view on line 6—6 of Fig. 2;

Fig. 7 is a similar view on line 7—7 of Fig. 2;

Fig. 8 is a side elevation of one end of the upper longitudinal grid member showing a modified construction;

Fig. 9 is a vertical, sectional view on line 9—9 of Fig. 8;

Fig. 10 is a side elevation of the upper grid member;

Fig. 11 is a similar view of the lower grid member;

Fig. 12 is a similar view of a spacing strip;

Fig. 13 is a side view of the lower grid member, transverse members and spacing strip partially assembled;

Fig. 14 is an elevation of one of the transverse members; and

Fig. 15 is a transverse, sectional view on line 15—15 of Fig. 13.

Referring to the drawing, the reference numeral 1 designates a pan forming a portion of an ice tray. This pan may be constructed of any suitable material, but is preferably made of metal or other heat conductive material to facilitate freezing of the cubes. It may be of any size and shape and in practice will be made of various sizes to accommodate itself to freezing units of various sizes in which it is used. One end of the pan is provided with an end wall 2 which is substantially at right angles to the bottom 3 of the pan and the other end is preferably rounded as at 4. The side walls 5 of the pan may be provided with a slight outward flare to facili-

tate removal of the cubes. The upper edges of the side walls are turned over to form beads 6 for strengthening the pan and at the front and back similar beads 7 are slightly spaced from the corresponding wall providing a shelf or flange 8. The grid comprises a lower longitudinal member 9 and an upper longitudinal member 10. The lower member consists of a strip of metal preferably of uniform width throughout substantially its entire length having end sections 9' and 10' extending upwardly a distance slightly greater than the height of the pan. As shown, the end section 10' is curved on its lower edge corresponding to the curvature 4 of the end wall of the pan. The upper longitudinal member 10 is of a width slightly greater than the height of the pan and this member is provided with a plurality of spaced slots 11 and 12. The alternate slots 11 are of greater height than the slots 12 and are of a suitable height to receive the cross members. The slots 12 are of sufficient height to clear the lower longitudinal member and a spacing strip 13 which is arranged between the upper and lower longitudinal grid members when the device is assembled.

The material between the slots 11 and 12 is alternately offset to clear the lower longitudinal member and provide extensions 14 which lie on opposite sides of the lower longitudinal grid member. These extensions are provided with projections 15 adjacent their lower ends. The projections may be formed by offsetting the metal of which the upper longitudinal grid member is constructed from the opposite side. In each of the slots 11 a cross member or transverse fin 16 is arranged. The transverse members are provided with slots 17 adjacent their upper ends which are of greater depth than the distance between the top of the slot 11 and the upper edge of the upper longitudinal member, thus permitting relative movement of these two members. The transverse members are further provided with lower slots 18 which terminate short of the lower edge of the transverse members. The lower edge of the lower longitudinal member is provided with aligned slots 19.

A pair of levers 20 are pivotally mounted on the longitudinal members to permit raising of the grid and to permit relative movement of the upper and lower grid members. As shown, the end extensions 9' and 10' of the lower grid members are provided with openings 21 for the reception of pivot pins 22 and these pivot pins also pass through elongated openings 23 in the upper longitudinal grid members. The upper longitudinal grid members are further provided with openings 24 for the reception of pins 25. Beyond the pivot pins the levers are provided with toes or extensions 26 to engage the flanges 8 on the edge of the pan. The levers may be of any suitable construction but I have disclosed them as being substantially channel-shaped having flanges 27, which flanges are enlarged adjacent their ends as indicated at 28 to provide for the reception of the pivot pins. Each lever is provided with a pair of openings in each flange which, when the grid is assembled, are in alignment with the openings 21 and 24.

In Figs. 8 and 9 I have illustrated a modification of the invention in which the tabs or extensions 14 of the upper longitudinal grid member, instead of being provided with the projections 15 are merely flared outwardly as at 29 to give lateral movement to the cubes when relative movement of the two grid members occurs.

Referring to Figs. 10 to 15 of the drawings, the grid is assembled by first placing the transverse members 16 on the lower longitudinal member by passing the lower longitudinal member through the slots 18 until one transverse grid member is arranged in alignment with each of the slots 19. The slots 18 are made of greater height than the cross-sectional height of the longitudinal member to permit this operation and to permit the transverse members to be passed over the curved end 10' of the lower longitudinal member. After the transverse members are in position in alignment with the slots 19 and in the lower position shown at the right of Fig. 13, they are moved upwardly into the slots 19 so that the upper portion of each slot 18 is clear. The spacing strip is then threaded through the upper portions of the slots 18 as indicated in Fig. 13, the spacing strip being of a width to fill the remainder of the slots 18 and having its lower edge curved to conform to the upper surface of the lower longitudinal member. The transverse members are thus secured to the lower longitudinal member to prevent relative vertical movement of these members, but the width of the slots 18 and 19 is greater than the thickness of the metal as shown to permit slight relative movement of these parts.

The upper longitudinal member is then assembled with the rest of the structure by passing it downwardly over the transverse members with the slots 11 in alignment with the transverse members. The body of the longitudinal member is thus received in the slots 17 and the portion of the transverse member between the slots 17 and 18 enters the slots 11. The projections 14 are alternately offset to place them on opposite sides of the lower longitudinal member (see Figs. 4 and 5). The handles 20 are then assembled by passing the bolts 22 and 25 through the proper openings, the bolts 22 passing through the openings 21 in the lower longitudinal member and the openings 23 in the upper longitudinal member and being received in the openings in the flanges. The opening in the flange which receives the threaded end of the bolt (see Fig. 6) is internally threaded.

The tray is then placed in the freezing unit, filled with water, and the cubes formed. When the cubes are to be removed from the tray, the levers 20 are moved in an arc of a circle from the position indicated in Fig. 2 of the drawing to the position indicated in Fig. 3 of the drawing. This initial movement, with the toes 26 of the levers in engagement with the flanges 8, causes the entire grid to be raised from the position shown in Fig. 4 of the drawings to the position shown in Fig. 5 of the drawings. This upward movement releases the cubes from the pan but the cubes are still fastened to the grid. Continued upward movement of the levers 20 causes the upper grid member to be moved relatively to the lower grid member and this movement is permitted by the provision of the elongated slots 23. The pivot pins 22 move downwardly in these slots with the upper grid member being moved upwardly by the pivot pins 25. As this relative movement of the grid members takes place, the projections 15 ride out of the depressions which they have formed in the ice cubes and engage the side of the cube at an adjacent point causing the cubes to be moved laterally and thus release the cubes from the grid.

In the form of the invention shown in Figs. 8 and 9, the operation is substantially the same, the cubes being moved laterally by the flared lower ends of the tabs or projections 14 to release them from the grid.

I claim:

1. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member being provided with extensions extending downwardly adjacent the lower longitudinal member, said extensions having projecting portions, and a pair of levers connected to the upper and lower longitudinal members, said levers being constructed to engage the edge of the pan when they are swung on their pivots to raise the grid in the pan, and upon further movement to cause relative movement of the upper and lower longitudinal members.

2. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member being provided with a plurality of spaced slots forming extensions, the extensions being offset to arrange alternate extensions on opposite sides of the lower longitudinal member when the members are assembled, each of the extensions being provided with a projecting portion, and a pair of levers connected to the upper and lower longitudinal members, said levers being constructed to engage the edge of the pan when they are swung on their pivots to raise the grid in the pan, and upon further movement to cause relative movement of the upper and lower longitudinal members.

3. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member being provided with a plurality of spaced slots, the material between the slots being offset and forming extensions alternate extensions disposed on opposite sides of the lower longitudinal member when the members are assembled, one extension being arranged on each side of the lower longitudinal member between each two adjacent transverse members, each of the extensions having a projecting portion, and a lever connected to the upper and lower longitudinal members adjacent each end, said levers being constructed to engage the edge of the pan when they are swung on their pivots to raise the grid in the pan, and upon further movement to cause relative movement of the upper and lower longitudinal members.

4. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member being provided with extensions extending downwardly adjacent the lower longitudinal member, said extensions having projecting portions, and means for initially raising the grid in the pan to separate the grid and the cubes from the pan and then raising the upper longitudinal member with respect to the remainder of the grid to separate the cubes from the grid.

5. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member having extensions extending downwardly on each side of the lower longitudinal member between each two consecutive transverse members, said extensions having projections formed thereon, and means for raising the grid in the pan to separate the cubes from the pan and then raising the upper longitudinal member with respect to the rest of the grid to separate the cubes from the grid.

6. An ice tray comprising a pan and a grid in the pan, the grid comprising an upper longitudinal member, a lower longitudinal member, and transverse members, the upper longitudinal member having extensions extending downwardly on each side of the lower longitudinal member between each two consecutive transverse members, said extensions having projections formed thereon, and manually actuated lever means for raising the grid in the pan to separate the cubes from the pan and then raising the upper longitudinal member with respect to the rest of the grid to separate the cubes from the grid.

7. An ice tray comprising an open top pan and a grid in the pan, the grid comprising a lower longitudinal member extending the length of the pan and having a lower edge of the same contour as the bottom and end walls of the pan, the lower longitudinal member being provided with end sections extending upwardly above the top of the pan, a plurality of transverse members having openings in their lower portions for the reception of the lower longitudinal member, the transverse members and the lower longitudinal member being secured together against relative vertical movement, and an upper longitudinal member having slots extending from its lower edge for the reception of the transverse members, the transverse members having slots to receive the upper portion of the upper longitudinal member, the upper longitudinal member being movable with respect to the lower longitudinal member and transverse members, the upper longitudinal member having extensions between the slots extending downwardly in close proximity to and on opposite sides of the lower longitudinal member, projections formed on the extensions to form irregular surfaces on the sides of ice cubes formed in the spaces between the longitudinal members, each two adjacent transverse members and the side wall of the pan, and force multiplying means for initially raising the grid in the pan to release the cubes from the pan and then raising the upper longitudinal member with respect to the rest of the grid to release the cubes from the grid.

8. An ice tray comprising an open top pan, a grid in the pan, the grid comprising a lower longitudinal member, transverse members carried by the lower longitudinal member, and secured to the lower longitudinal member against relative vertical movement with respect thereto, and an upper longitudinal member capable of relative movement with respect to the lower longitudinal member and the transverse members, the upper longitudinal member being provided with extensions arranged adjacent to and on opposite sides of the lower longitudinal member, projections formed on the extensions, and lever actuated means for raising the grid in the pan to release ice cubes from the pan and then raising the upper longitudinal member with respect to the rest of the grid to release the cubes from the grid.

9. An ice tray comprising an open top pan and a grid, the grid comprising a lower longitudinal member extending the length of the pan and having a lower edge of the same contour as the bottom and end walls of the pan, the lower longitudinal member being provided with end sections

extending upwardly above the top of the pan, transverse members having openings in their lower portions for the reception of the lower longitudinal member, the transverse members and the lower longitudinal member being secured together against relative vertical movement, and an upper longitudinal member having slots extending from its lower edge for the reception of the transverse members, the transverse members having slots to receive the upper portion of the upper longitudinal member, the upper longitudinal member being movable with respect to the lower longitudinal member and transverse members, the upper longitudinal member having extensions between the slots extending downwardly in close proximity to and on opposite sides of the lower longitudinal member, projections formed on the extensions to form irregular surfaces on the sides of ice cubes formed in the space between the longitudinal members, a pair of transverse

members and the side wall of the pan, a pair of operating levers connected to the end sections of the lower longitudinal member and to the upper longitudinal member and having a second connection to the upper longitudinal member spaced therefrom, the levers being provided with extensions adapted to engage the upper edge of the pan when the levers are swung on their pivots to first raise the grid in the pan and upon further movement to cause relative movement of the upper and lower longitudinal grid members.

MICHAEL K. BUCHANAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,154,356	Reeves	Apr. 11, 1939