Oct. 28, 1941. C. R. CARNEY 2,260,363

AUTOMATIC ICE TRAY

Filed June 17, 1940

FIG. 1.

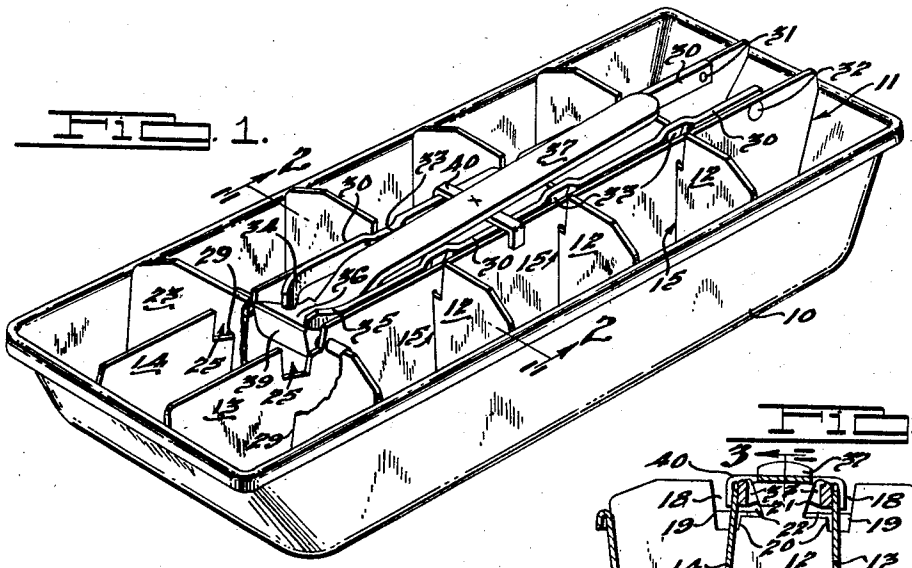


FIG. 2.

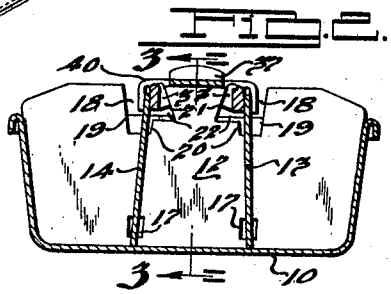


FIG. 3.

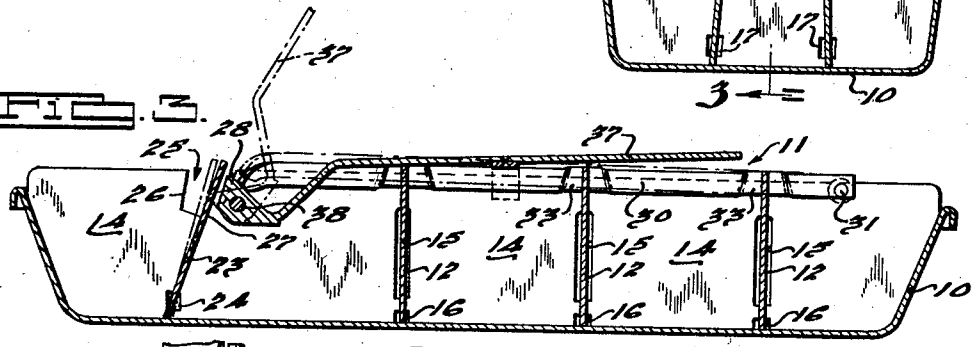
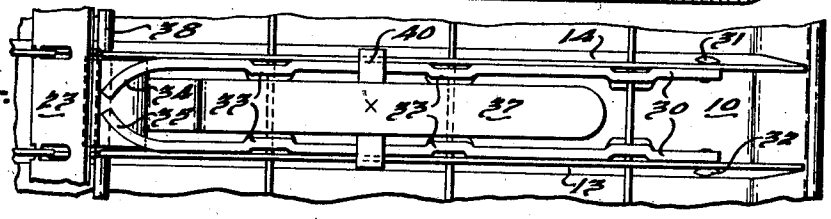


FIG. 4.



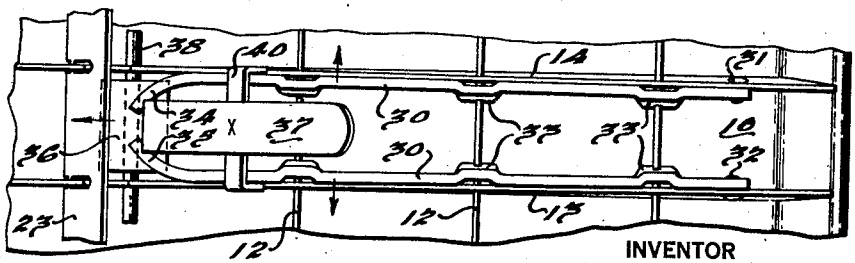


FIG. 5.

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AUTOMATIC ICE TRAY

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15 Claims. (Cl. 62—108.5)

The present invention relates to new and useful improvements in ice grid and tray structures relating particularly to such structures having a removable grid disposed in the tray, said grid being provided with movable members actuated by a lever system carried by the grid.

Heretofore considerable difficulty has been experienced in effecting the release of the ice block partitioning mechanism or grid from the tray or pan and also in effecting the removal of the individual ice blocks or cubes from the grid and tray.

It is a principal object of the present invention to overcome these difficulties and to provide a durable, conveniently operable ice tray and grid structure effective for easily and promptly releasing ice blocks from the grid and tray, and for releasing the grid from the tray.

Another object of the invention is to provide a grid structure having substantially upright transverse members mounted on substantially upright longitudinal members and to provide for a movement of certain of such grid members for freeing the ice blocks or cubes from freezing contact with the grid or tray. More particularly, I propose to effect a generally lateral movement or spreading of said longitudinal members and also to effect a generally longitudinal movement of a predetermined transverse member from an angularly inclined position toward a substantially vertical position. Such movements of the longitudinal members and of the inclined transverse member preferably take place simultaneously, although one such movement may be started or completed prior to the other one and these movements may take place successively rather than simultaneously.

A further object of the invention is to provide novel mechanical actuating means for accomplishing the aforementioned movements of the grid members, and to attain such movements through a lever system carried by the grid. As a part of this system, a single manually operable handle is preferably provided which is operably connected with the grid members, said handle moving said longitudinal members through operating means or members carried by the longitudinal members and operably associated with the handle. For moving the longitudinal members, cam-like portions are preferably provided on said operating members which contact relatively fixed portions of the grid, such as the transverse members other than the one arranged to be moved by the operating lever system.

Another object of the invention is to make the ice grid and tray structure of the present invention self-contained, thereby eliminating the necessity for ice removing aids or means separate from the grid and tray, such, for instance, as warming the structure or applying an extraneous implement to parts thereof.

It is another object of the invention to provide improved means for easily removing the grid from the tray, since the grid is not only freed from the tray by movement of the aforesaid operating handle and lever system, but said handle provides a convenient handgrip for lifting the grid from the tray and for returning it to the tray after the removal of the ice blocks.

Another object of the invention is to provide a clip member, preferably carried by the operating lever or handle, for maintaining the longitudinal grid members in a relatively unspread condition during the freezing of the ice blocks or cubes therein.

Other objects and advantages of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a view in perspective of an ice tray and grid structure embodying the present invention.

Fig. 2 is a cross sectional view of the form of the invention shown in Fig. 1, and is taken substantially along the line 2—2 of Fig. 1 in the direction of the arrows.

Fig. 3 is a longitudinal section of the form of the invention shown in Fig. 1, and is taken along the line 3—3 of Fig. 2 in the direction of the arrows.

Fig. 4 is a partial top plan view of the form of the invention shown in Fig. 1.

Fig. 5 is a view similar to Fig. 4, but shows the parts of the structure in an ice removing position.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the pur-

pose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the embodiment of the invention shown in the drawing, the reference numeral 10 represents an ice tray of any desired shape and size and formed of a suitable material, such as aluminum. The reference numeral 11 represents, in general, a grid removably disposed in the tray 10. This grid, when so disposed, provides a plurality of compartments in which a liquid body is confined and frozen into cubes or into blocks of any other desired shape. The grid 11 comprises a plurality of longitudinally spaced relatively fixed transverse members 12, and a pair of laterally spaced longitudinal members 13 and 14. The longitudinal members are provided with a plurality of longitudinally spaced generally vertically disposed slots 15 (Fig. 3) which extend from a point adjacent the upper part of the longitudinal members to a point adjacent their lower edges. Immediately below each slot 15 there is provided in the longitudinal members an aperture or notch 16 which is situated in a vertical plane relative to the slot 15. The longitudinal members 13 and 14 are mounted in assembled relation with respect to the relatively fixed transverse members 12 by the insertion of portions of each transverse member in the slots 15 of the longitudinal members (Fig. 1). In addition, the transverse members are provided with a pair of apertures or notches 17 (Fig. 2) through which extend flange-like portions of the longitudinal members.

It will be observed that the upper edges of each of the fixed transverse members 12 are formed with a pair of compound slots 18 (Fig. 2). Each slot 18 is defined at its outer end by an edge portion 19 of the transverse member, and at its intermediate part by the edge portion 20 of the transverse member. The inner part of each slot 18 is defined by the edge portion 21 of the transverse member which is offset from the portion 20 in the manner clearly indicated in Fig. 2. The portion 21, it will be observed, is generally angularly inclined. Accordingly, the portions 20 and 21 of the transverse member define an inwardly extending portion of the compound slot 18. Expressed in another way, this inwardly extending portion constitutes a recess 22 having a generally angularly inclined wall defined by the portion 21. This recess, in particular its inclined wall, is especially useful in connection with the ice removing mechanism described hereinafter.

Referring in particular to Fig. 2, it will be noted that the upper portion of the longitudinal members 13 and 14 are disposed in the compound slots 18 in the transverse members 12. Moreover, the slots 17 in these transverse members are so located with respect to the slots 18, that the longitudinal members 13 and 14 are inclined angularly from the vertical. More particularly, these longitudinal members 13 and 14 are in the normal or ice freezing position inclined angularly toward each other and rest adjacent to or against the edge portions 20 of the transverse members. The longitudinal members 13 and 14 are laterally movable toward a completely vertical position, that is, they are movable away from the edge portions 20 until stopped by the edge portions 19. As indicated hereinbefore, however, the transverse members 12 are relatively fixed and are substantially vertically positioned although they may move slightly within the slots 15, see Fig. 3. However, this movement is very limited.

The reference numeral 23 represents a movable transverse member additional to the aforementioned relatively fixed transverse members 12. This movable transverse member 23 is mounted on the longitudinal members 13 and 14. In this connection, an aperture or notch 24 (Fig. 3) is provided in the lower edge of each of the longitudinal members and a flange-like portion of the movable transverse member 23 projects therethrough. Also, the upper edge of each of the longitudinal members 13 and 14 is formed with a compound slot 25 generally similar to the compound slots 18 in the transverse members 12. Referring in particular to Fig. 3, each slot 25 is defined at its forward end by an edge portion 26 of the longitudinal member and at its intermediate part by the edge portion 27 of the longitudinal member. The rear part of each slot 25, is defined by an edge portion 28 of the longitudinal member which is offset longitudinally from the edge portion 27. The movable transverse member 23 is provided with a pair of generally vertically disposed slots 29 (Fig. 1) through which extend the longitudinal members 13 and 14. The upper portion of the movable transverse member 23, that is, the portion above the slot 29, is disposed in the compound slot 25 of the longitudinal members. Moreover, the aperture 24 and the compound slot 25 are so positioned with respect to each other that the movable transverse member 23 is normally inclined in the direction of the substantially fixed transverse members 12 and normally rests against the intermediate edge portion 27 in the ice freezing position. The movable transverse member 23 may be longitudinally moved forwardly of the edge portion 27 toward a generally upright position, as indicated in dotted lines in Fig. 3, until stopped by the edge portion 26 of the longitudinal members. The means for so moving the transverse member 23 constitute a part of the ice removing mechanism of the present invention and is fully described hereinafter.

The longitudinal members 13 and 14 and the movable transverse member 23 are moved toward the vertical by a lever system carried by the grid 11. This lever system includes a pair of actuating members 30—30, one of which is associated with each of the longitudinal members 13 and 14 and extends lengthwise of said member in the space between the longitudinal members. Each of the members 30 is pivoted to one of the longitudinal members 13 and 14 as shown at 31 and 32 (Figs. 1, 4 and 5). These members 30 are provided with cam-like portions 33 which project inwardly into the space between the longitudinal members 13 and 14. Each of these cam-like portions 33 is generally vertically inclined and is arranged to fit within one of the recesses 22 in the substantially fixed transverse members 12 so that its inclined surface lies immediately adjacent the inclined wall (shown at 21) of the recess 22. However, the cam-like portions 33 are so positioned only when the longitudinal members 13 and 14 are in their most inclined or ice forming position and serve to move these longitudinal members toward the vertical by sliding over the inclined walls of the recesses 22 in the manner explained hereinafter.

The forward end of each of the actuating members 30 is inwardly curved as shown at 34 and 35 and lies immediately adjacent the longi-

tudinally and upwardly inclined part 36 of the hand operable lever or handle 37. The lever 37 is pivoted to the longitudinal members 13 and 14 as shown at 38 (Figs. 3 to 5 inclusive).

In addition to the inclined part 36 of the lever 37, it will be noted that this lever is provided with an additional forwardly and upwardly inclined portion 39, and that both the inclined portions 36 and 39 lie adjacent the pivot 38. Moreover, the inclined portion 39 is so constructed that it possesses an inclination substantially the same as that of the movable transverse member 23 when in the normal or ice forming position. Thus, when the lever 37 is in the position shown in Fig. 1, the inclined portion 39 lies immediately adjacent the rear face of the member 23, as indicated in solid lines in Fig. 3. On movement of the lever 37 this inclined portion 39 is adapted to exert a camming force to move the transverse member 23 toward the vertical as pointed out in later passages hereof. The lever 37 is provided with a clip 40 which may comprise a cross piece fixed to the lever 37 and having turned down ends as clearly shown in Fig. 1. This clip functions to hold the longitudinal members 13 and 14 in their most inclined or ice forming position, when the lever 37 is in its lowered position, and thereby aids in rigidly holding the parts of the grid together during the freezing of the ice blocks or cubes.

The operation of the aforesaid lever system carried by the grid 11 for moving the longitudinal members 13 and 14 and for moving the movable transverse member 23 toward the vertical, in order to release ice from the grid and tray structure, is as follows:

The hand operable lever or handle 37 is raised from its inoperative position as shown in Fig. 1 toward its position as shown in dotted lines in Fig. 3. This movement first removes the clip 40 from the longitudinal members 13 and 14 and thereafter the inclined cam 39 of the handle 37 contacts the rear face of the movable transverse member 23 and moves this member from its normal inclined position toward the upright or vertical position as clearly indicated in dotted lines in Fig. 3. This movement of the movable transverse member 23 may continue until the member 23 is stopped by the forward wall (shown at 26) of the slot 25 within which the member 23 moves. Continued movement of the lever 37 causes the bent portions 34 and 35 of the actuating members 30 to contact the sides of the lever 37 and to be elevated by the inclined portion 36 of the operating lever 37 which is moved with respect to the bent portions 34 and 35 and causes a lifting of the actuating members 30 about the pivots 31 and 32 relative to the longitudinal members 13 and 14. At the same time the actuating members 30—30 are laterally spread apart by the action of the inclined portion 36 in moving with respect to the bent portions 34 and 35. This combined spreading and lifting movement of the members 30, in particular the lifting thereof, slides the angularly inclined cam-like portions 33 over the angularly inclined walls, shown at 21, of the recesses 22, which sliding further moves the actuating members 30—30 in a lateral direction. This lateral movement of the actuating members 30—30 is immediately transferred to the longitudinal members 13 and 14 to which the members 30 are attached and moves the longitudinal members from their inclined position toward a substantially upright or vertical position. This movement may continue until the longitudinal members 13 and 14 are stopped by the outer edge portions 19 of the compound slots 18 within which the longitudinal members move.

It will thus be observed that the lever 37 simultaneously moves each of the longitudinal members 13 and 14 toward a vertical position, and at the same time moves the movable transverse member 23 toward a vertical position. However, it will be understood that by simple mechanical changes, particularly in respect to the position of the curved members 34 and 35 relative to the inclined part 36 of the member 37, that movement of the longitudinal members and of the movable transverse member could be rendered successive rather than simultaneous or one such movement could be started or completed prior to the other one. It will also be understood that the present ice removing mechanism may be very readily returned, after removal of the ice blocks, by the simple expedient of returning the lever 37 from its raised position shown in dotted lines in Fig. 3 to its lowered position shown in Fig. 1. This returning movement of the lever 37 permits the movable transverse member 23 to return to its inclined position, and this member is inclined at an angle such that it will return by gravity. Preferably, but not necessarily, this angle is approximately 70° relative to the horizontal. Also, on returning the lever 37 to its position shown in Fig. 1, the cam-like portions 33 are again fitted within the recesses 22 thereby lowering the actuating members 30 and permitting the longitudinal members 13 and 14 to return to their inclined positions. In addition, the turned down ends of the clip 40 again placed over the edges of the longitudinal members 13 and 14 to hold them in the normal angularly inclined or ice forming position.

In view of the foregoing, it will be understood that the present grid and tray structure provides a conveniently operable structure which is effective in releasing ice blocks or cubes from the grid and tray. In addition, the grid is released from freezing contact with the tray and may easily be removed therefrom and returned thereto. Moreover, the ice removing mechanism of the present invention is carried by the grid so that the structure is self-contained thereby eliminating the necessity for ice removing aids or means separate from the grid and tray structure such as warming the structure, or utilizing an extraneous implement or tool.

I claim:

1. An ice tray and grid structure which comprises an ice tray, a grid in said tray comprising a pair of angularly inclined longitudinal members and a plurality of substantially upright transverse members, said grid members being mounted with respect to each other so that said longitudinal members are movable in a lateral direction relative to the tray and one of said transverse members is movable in a longitudinal direction relative to the tray while the remainder of said transverse members are relatively immovable, actuating members associated with said longitudinal members for moving said movable grid members, and a lever carried by said longitudinal members for operating said actuating members to move said longitudinal members, said lever having connections effective to move said transverse member.

2. An ice tray and grid structure which comprises an ice tray, a grid removably disposed in said tray comprising a pair of angularly inclined movable longitudinal members and a plurality of

generally vertically disposed transverse members one of which is movable from an angular position towards the vertical position, and means carried by the grid for moving said movable grid members including force transferring members having cam portions for contacting fixed portions of the grid and a lever pivoted to the longitudinal members for operating said force transferring members by moving said cam portions over said fixed portions for moving said longitudinal members from said angularly inclined position towards the vertical position, said lever also moving said movable transverse member toward the vertical position.

3. An ice tray and grid structure which comprises an ice tray, a grid disposed in said tray comprising a pair of angularly inclined longitudinal members, a plurality of relatively fixed upright transverse members, an angularly inclined transverse member, said longitudinal members and said angularly inclined transverse member being movable toward the vertical, and means for so moving said movable grid members comprising an actuating member carried by each longitudinal member and having cam portions normally fitting within recesses in said fixed transverse members and a lever pivoted to said longitudinal members for moving said cam portions over the recess defining portions of said fixed transverse members for moving said longitudinal members toward the vertical position, said lever also contacting said angularly inclined movable transverse member for moving it toward the vertical position thereby releasing ice from said grid and tray.

4. A structure as set forth in claim 3 in which the pivoted lever is provided with a clip for retaining the longitudinal members in their angularly inclined position when said lever is in its folded position.

5. An ice tray and grid structure which comprises an ice tray, a removable grid disposed in said tray including a plurality of relatively fixed upright transverse members and a pair of longitudinal members mounted on said transverse members for movement from an angularly inclined position toward a vertical position, and means for so moving said longitudinal members comprising a pair of actuating members carried by and extending longitudinally of said longitudinal members and having cam portions for contacting said fixed transverse members and a lever operably associated with said actuating members for moving said cam portions over said fixed members and thereby to move said longitudinal members toward a vertical position.

6. A structure as set forth in claim 5 in which the cam portions of the actuating members are angularly inclined with reference to the bottom of the tray and said relatively fixed transverse members are provided with recesses having generally angularly inclined walls whereby sliding movement of said cam portions over said walls moves said actuating members for moving said longitudinal members toward a vertical position.

7. A structure as set forth in claim 5 in which said lever is pivoted to said longitudinal members, and said actuating members possess curved portions lying adjacent the pivoted lever and are adapted to be contacted thereby for generally lateral movement, thereby moving said longitudinal members toward a vertical position.

8. An ice tray and grid structure which comprises an ice tray, a grid in said tray comprising a pair of substantially upright longitudinal separator member and a plurality of transverse separator members, at least one of said transverse separator members being movable from an angularly inclined position towards the vertical position and the remainder of said transverse members being relatively immovable, and means for moving such inclined transverse member toward a completely vertical position including a lever pivoted to the longitudinal members and having a portion for contacting said movable transverse member.

9. A structure as set forth in claim 8 in which said pivoted lever is provided with an angularly inclined portion adjacent its pivot, the slanting surface of which possesses substantially the same angular inclination as that of the inclined transverse member and lies immediately adjacent said member for effecting movement of the same upon actuation of the lever.

10. A grid for an ice tray comprising a plurality of substantially fixed generally vertically disposed transverse separator members provided with edge portions defining transversely spaced recesses, a pair of transversely spaced longitudinal separator members mounted on said relatively fixed transverse members at an angle from the vertical and being movable toward a vertical position, an additional transverse member mounted on said longitudinal members and movable thereon from an angularly inclined position towards the vertical position, grid actuating means comprising an operating member carried by each longitudinal member and each disposed to lie within one of the transversely spaced recesses of said transverse members and having cam portions fitted within said recesses when said longitudinal members are in their most inclined position, and a hand operable lever carried by said longitudinal members and movable from a folded or inoperative position for moving said cam portions over the edge portions defining the transversely spaced recesses of said fixed transverse members to lift and spread apart said actuating members and thereby to move said longitudinal members toward the vertical position, said lever also contacting said movable transverse member for moving it toward the vertical position.

11. A structure as set forth in claim 10 in which the hand operable lever is provided with a cross piece having a clip for holding the longitudinal members in their angularly inclined positions when said lever is in its folded or inoperative position.

12. A grid for an ice tray comprising a plurality of substantially fixed upright transverse members having edge portions defining transversely spaced recesses, a pair of transversely spaced longitudinal members mounted on said substantially fixed transverse members at an angular inclination toward each other and being movable toward a vertical position, an additional transverse member mounted on said longitudinal members and movable from an angular position toward a vertical position, an actuating member carried by each longitudinal member and having cam portions extending into said transversely spaced recesses of the fixed transverse members to engage the edge portions thereof, and a hand operable lever pivoted to said longitudinal members for moving said cam portions over the recess defining edge portions of said fixed transverse members to lift and spread apart said actuating members and thereby to move said longitudinal members toward the vertical position, said lever also contacting said additional trans-

verse member for moving it toward the vertical position.

13. A grid for an ice tray comprising a plurality of substantially fixed generally vertically disposed transverse members provided with transversely spaced angularly inclined edge portions defining spaced recesses, a pair of transversely spaced longitudinal members mounted on said relatively fixed transverse members and being movable from angular positions towards the vertical position, an additional transverse member mounted on said longitudinal members and movable from an angular position towards the vertical position, ice removing means comprising an operating member carried by each longitudinal member and having angularly inclined cam portions engaging the angularly inclined edge portions defining the spaced recesses of the transverse members when said longitudinal members are in their angularly inclined position, and a manually operable lever pivoted to said longitudinal members for lifting said operating members to move said cam portions over said angularly inclined edge portions of said recesses to move said longitudinal members toward the vertical position, said lever also contacting said additional transverse member for moving it angularly toward the vertical position.

14. A structure as set forth in claim 12 in which said actuating members are provided with curved portions lying adjacent an inclined portion of said lever whereby movement of said lever spreads said actuating members apart in addition to lifting them for moving said longitudinal members toward a vertical position.

15. A structure as set forth in claim 13 in which said lever possesses an upwardly inclined portion and said actuating members possess curved portions lying over said inclined portion so that movement of said lever lifts and also spreads said actuating members apart.

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