

Dec. 24, 1940.

O. SCHWIMMER

2,226,413

ICE-CUBING APPARATUS

Filed Jan. 12, 1938

3 Sheets-Sheet 1

FIG. 1.

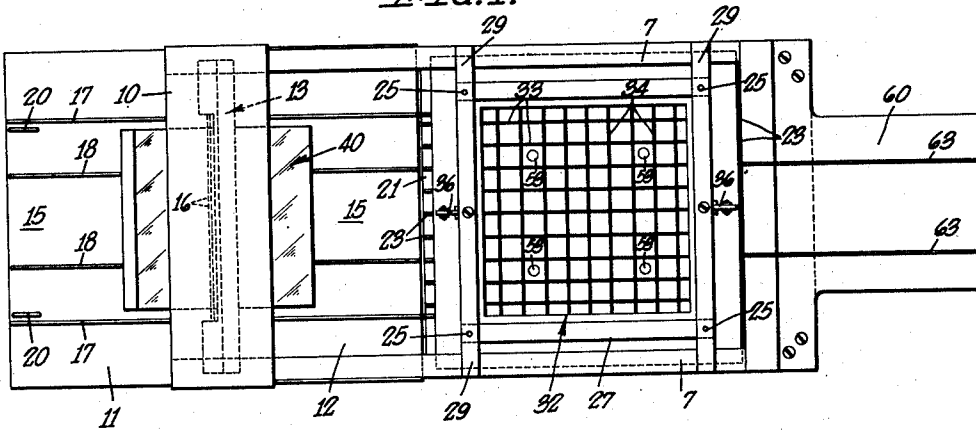


FIG. 2.

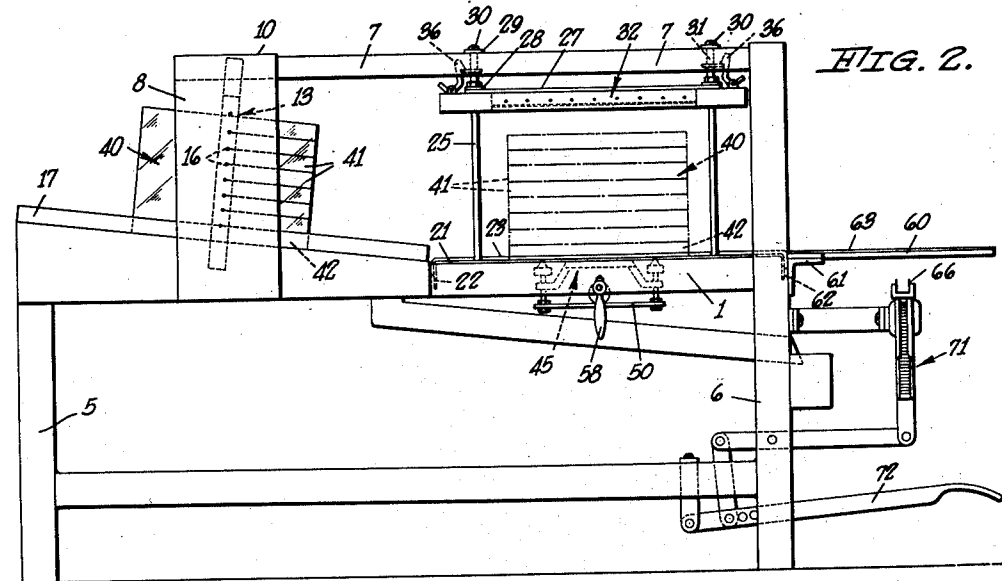
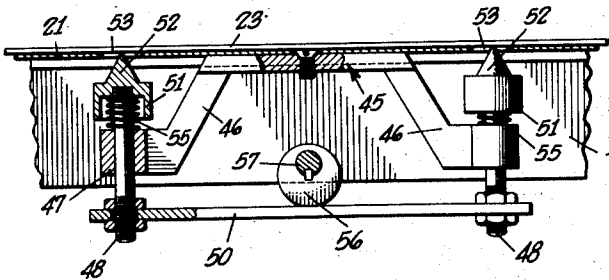


FIG. 3.



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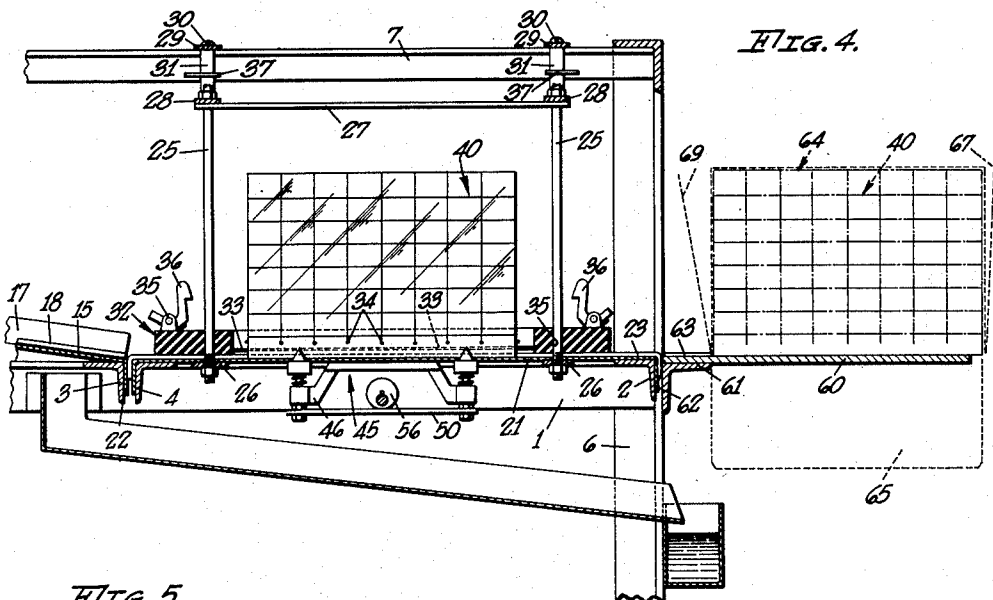
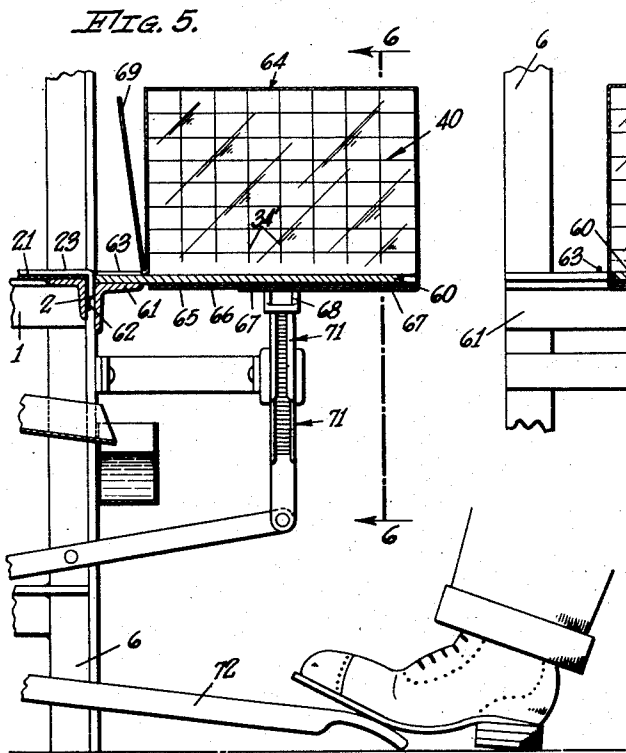
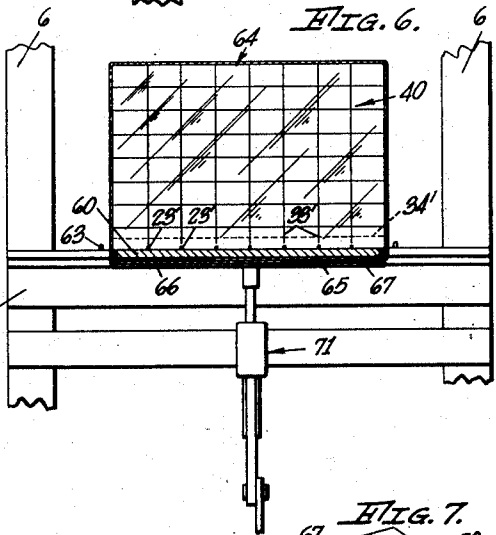
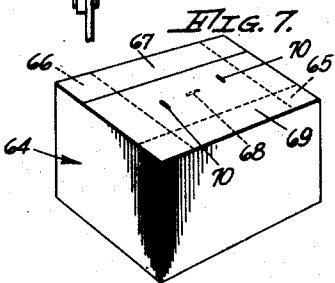
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

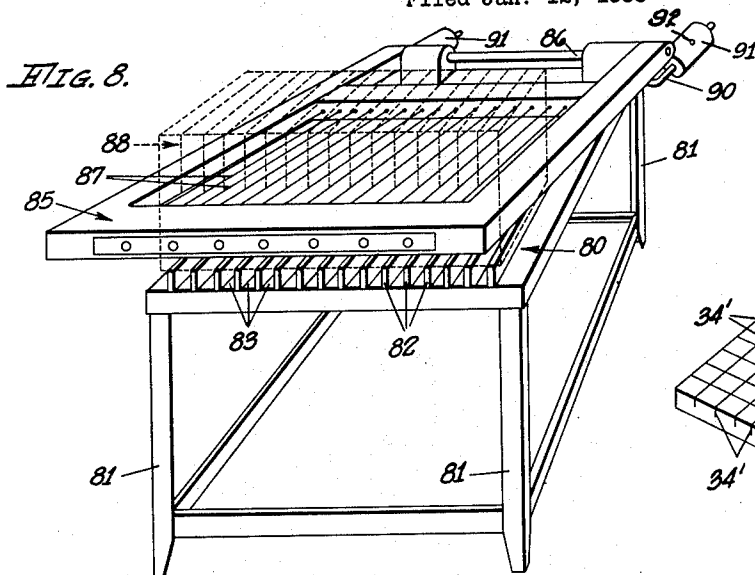
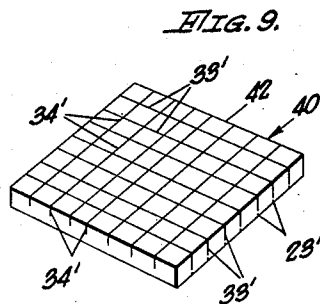
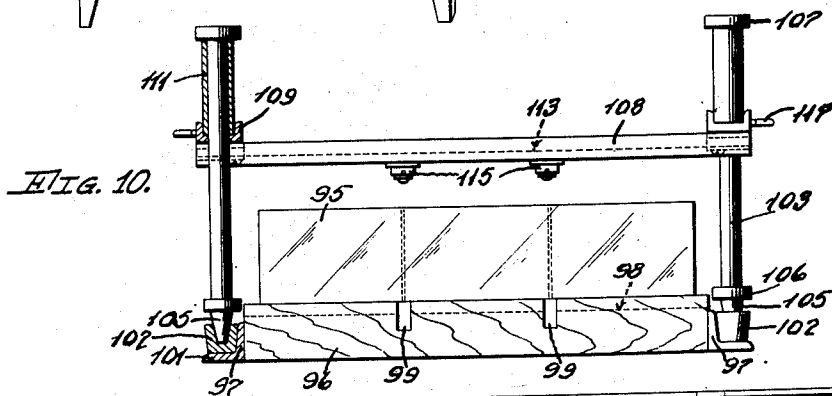
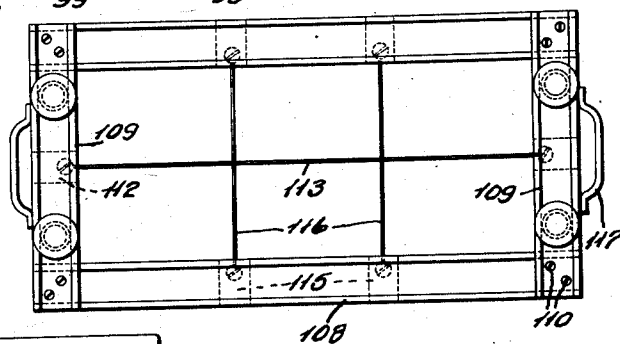
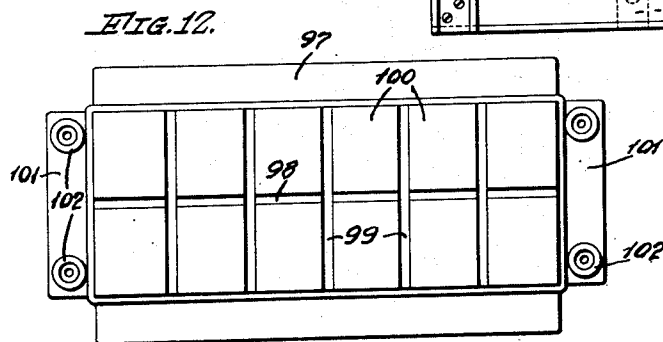


FIG. 11.



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ICE-CUBING APPARATUS

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Application January 12, 1938, Serial No. 184,590

12 Claims. (Cl. 219—19)

This invention relates to improvements in methods and apparatus for cutting and packaging ice-cubes.

The principal object of my invention is to provide ice-cutting apparatus employing a grid-frame in which electrically heated wires are connected, said grid being mounted to pass through a block of ice by its gravity to sever the same into slabs or cubes.

A further object of the invention is to provide an ice-cutting machine having a pair of ice-cutting grids utilizing electrically heated wires for severing the ice into slabs and then into cubes, respectively, the ice being mounted upon an inclined plane to pass between the first grid and the slabs thus formed are subsequently held in stationary position while the second grid provided with rectangularly crossed wires descends by gravity therethrough to complete the cube-cutting operations.

A still further object of my invention is the provision of means to sever ice slabs into cubes through a gravitationally actuated grid saving the lowermost slab which is only partially cut through to provide a scored slab that may be readily parted into cubes when needed and forms an integrally connected base upon which the superposed cubes are retained and supported and upon which they may be moved as a body with security for subsequent packaging operations.

A still further object of the invention is to provide a novel method of packaging ice-cubes through the retention of the cubes upon an integrally connected base-slab in their stacked condition after the cube-cutting grid has been removed, moving said stack of ice-cubes bodily upon an extending plate, placing a carton over said stack to contain the same, folding certain of the flaps of the carton under said plate, stapling or otherwise securing the folded flaps together to close the carton, slidably moving the carton and contained ice-cubes from the plate, and securing the remaining flap of the carton to securely seal the same.

Other objects and advantages residing in my invention, and objects relating to details of construction of the apparatus and variations thereof and in the method of cutting and packaging ice-cubes will be readily apparent in the course of the detailed description to follow.

The accompanying drawings illustrate by way of example representative forms of ice-cubing apparatus embodying my invention and illustrating the novel method of cutting and packaging ice-cubes involved, in which:

Figure 1 is a top plan view of my improved ice-cubing machine.

Fig. 2 is a view in side elevation of the same.

Fig. 3 is a detail view in side elevation, partly

in vertical section, of ice-securing devices employed in the invention.

Fig. 4 is a partial view of the machine in side-elevation showing the gravitational grid at the lowermost point of its travel through a stack of ice-slabs and also illustrating a stage in the packaging operations.

Figs. 5 and 6 are fragmentary views of the machine, respectively taken in side elevation and on lines 6—6 of Fig. 5, illustrating a further step in the packaging operations.

Fig. 7 is a perspective view of a completed package or carton containing ice-cubes.

Fig. 8 is a perspective view of a modified form of the invention.

Fig. 9 is a perspective view of a lowermost or base-slab of ice after being cut partially through in the operation of the machine.

Fig. 10 is a view in side elevation, partly in section, of a further modified form of my invention.

Fig. 11 is a plan view of the grid-frame and connected parts illustrated in Fig. 10.

Fig. 12 is a plan view of the base of the apparatus shown in Fig. 10.

Referring to said views, and particularly to Figs. 1 to 6, inclusive, the reference numeral 1 indicates the side rails of the rectangular bed-frame of my improved ice-cubing apparatus, rigidly connected at their opposite ends by end-rails, as 2, and intermediate their lengths by transverse rails 3 and 4, slightly spaced apart. Said bed-frame is supported upon legs 5 and 6 at front and rear, the latter extending upwardly for the rear support of top-rails 7 rigidly connected at their forward ends to side-stanchions 8 extending upwardly from the side-rails 1 and secured together at the top by plate 10.

Inclined bed-plates 11 and 12 are rigidly mounted on the bed-frame upon opposite sides of a grid-receiving transverse slot, not specifically shown, to receive the first grid 13 mounted between the stanchions 8 in substantially perpendicular relation with respect to the plane of said bed-plates. A sheet-metal chute 15 is supported on said bed-plates bridging the grid-receiving slot and extending through the grid 13 below the lowermost of its horizontally extending electrical-resistance wires 16.

The chute 15 is formed with upturned side edges 17 and is provided with a pair of spaced guide-wires 18 soldered or otherwise rigidly secured in parallel with the longitudinal axis of the machine. Short wire side-guides 20 are likewise secured adjacent the upper end of the chute to aid the operator in suitably spacing the block of ice on the chute.

At the rear end of the machine a horizontally positioned bed-plate 21 is mounted upon the rails 2 and 4. The adjacent ends of the bed-

plates 12 and 21 are turned downwardly, as at 22, over the respective transverse rails 3 and 4 leaving a space therebetween through which water melted from the ice-block may drain into the inclined pan therebelow.

Longitudinally of the bed-plate 21 a plurality of ridges or wires 23 are formed or secured equal in number and spacing to the distance of separation of the grid-wires employed in conjunction therewith and to be presently described. The wires 23 are designed to melt into the lowermost ice-slab to form underneath scorings therein and to aid in securing the ice-slabs in proper position for cutting. Two of the wires 23 are disposed in alignment with the guide-wires 18 and are received in the same scoring line formed in the lowermost ice-slab thereby.

Vertically arranged rods 25 are rigidly supported adjacent the four corners of the bed-plate 21 and are secured at their lower ends after passing through said bed-plate in transverse bars 26 borne upon the side-rails 1 and at their upper ends at the corners of a rectangular frame 27 whose transverse bars 28 are rigidly secured to similar bars 29 carried by the upper side rails 7 by bolts 30 extending through spacing-sleeves 31 in a well known manner.

32 indicates a grid-frame illustrated somewhat diagrammatically in which two series of electrical-resistance wires 33 and 34 are connected and are disposed in two planes and at right angles to each other. The lowermost series of wires 33 are extended longitudinally and are spaced similarly and directly above the wires 23 of the bed-plate 21. The grid 32 is slidably mounted upon the rods 25 at its four corners, the rods extending through apertures 35 in the frame. Latch-dogs 36 are mounted on the frame at opposite sides thereof and are spring-pressed inwardly to engage lugs 37 extending from the spacing-sleeves 31, respectively, to hold the grid in its raised position, as seen in Fig. 2.

In cutting an ice-block 40 into cubes by means of the apparatus described the block is placed upon the inclined chute 17 forward of the grid 13. The block will move by its gravity against the horizontal wires 16 whose radiant energy produced by the passage of electrical current therethrough causes the melting of the ice in horizontal lines and the formation of a vertical stack of ice-slabs 41.

After said slabs are thus cut the stack is slidably moved by its own gravity or positioned by the operator upon the bed-plate 21, the guide-wires 18 melted into the lowermost slab 42 having formed grooves in the underside of the slab and assuring the aligned positioning of the stack with respect to the grid 32.

After the ice-stack is thus positioned on the bed-plate 21 in symmetrical relation with respect to the grid 32 the latter is released by the operator and lowered along the rods 25 to rest upon the ice-stack, the lower wires 33 being in contact with the topmost slab of said stack.

The wires 33 and 34 are connected for the supply of electrical current thereto by a flexible cable, not shown, to a source of electrical current supply and such current may be controlled to energize each grid 13 or 32 selectively or simultaneously as may be desired by suitable switches, not shown. The cable extends through the bed-plate 12 and is protected from any moisture that may accumulate on said bed-plate by extending it through a tube, not shown, secured vertically in the bed-plate.

Upon the current being switched into the wires 33 and 34 the latter will melt their way into the ice-slabs severing each slab in turn into cubes while the grid descends along the rods 25 until it rests upon the bed-plate 21, as seen in Fig. 4.

As will be evident, the lowermost slab 42 is only partially cut through and remains intact except for rectangularly directed scorings 33' and 34' formed in its upper surface while the former scorings which are deeper owing to the lower plane of the wires 33 are separated from the underneath scorings 23' by a relatively narrow integument, as best seen in Fig. 9.

To ensure that the stack 41 of ice-slabs do not move during the ice-cutting operations just described I have provided means for holding the same against longitudinal movements as well as lateral movements, which latter are largely prevented by the melting of the ice to receive the wires 23 therein, as has been described.

Such retaining means consist of a pair of brackets 45 secured upon opposite sides of the longitudinal axis of the bed-plate 21 and each of said brackets is formed with a pair of oppositely extending arms 46 having a vertically directed bore 47 therethrough. Short rods 48 are slidably mounted in the bores 47 and therebelow the rods of each bracket are connected by a bar 50. At the upper end of each said rod a head 51 is secured having a conical upper end 52 adapted to extend through a circular aperture 53 in the bed-plate 21 and into the lower slab 42. A spring 55 is interposed between each arm 46 and the head 51 tending to urge the connected heads upward to project their conical points into the ice. Upon placing the ice-slabs in position or in removing the same all of the points are depressed below the level of the bed-plate in unison by means of a pair of cams 56 keyed upon a transverse rod 57 journaled in the side-rails 1, which cams bear upon the respective bars 50 and when manipulated by means of a handle 58 upon the rod 57 through a rotation of one hundred and eighty degrees will depress or release said points in an obvious manner. The points 52 are arranged at the corners of a rectangle within that occupied by the ice-stack and each medially of a square formed by the crossed wires of the grid 32. As will be understood the points 52 when released press against the under side of the lower slab 42 and melt their way into the ice through the residual heat therein or derived from the atmosphere in the room.

After the slabs have been cut as described the grid 32 is raised by the operator and secured in its elevated position, as shown in Fig. 2. The ice-cubes remain in their normal, piled condition upon the scored, lowermost slab 42 and may then be removed as a unit conveniently by sliding the same longitudinally along the wires 23.

To receive the stack of cubes a platen extension 60 is provided extending rearwardly in the plane of the bed-plate 21. Said platen is rigidly secured to an angle-bracket 61 and its projecting portion is of about the superficial area and proportions of said lowermost ice-slab. The platen is spaced from the bed-plate 21, as at 62 to provide an outlet for the water melted during the last cutting operations and into which the rear ends of the wires 23 may be downturned excepting those in line with the guide-wires 18 which may be extended over and secured upon the platen in the same longitudinal lines, as seen at 63 in Fig. 1. Or similar separate wires may be secured to the platen if desired.

With the stack of ice-cubes positioned symmetrically upon the platen 60, as seen in Figs. 4 to 6, inclusive, a carton 64 of heavy paper of the size and proportions to receive the stack of cubes and having one side open is inverted and placed over the stack somewhat in the manner indicated in broken lines in Fig. 4. The side flaps 65 and 66 of the carton are folded inwardly to overlap each other under the platen 60. The rear-most flap 67 is then folded to lap over the side flaps whereupon one or more staples, as 68, are driven into the lapped carton flaps to secure the latter together during the removal of the carton and contained ice-cubes from the platen, which is accomplished simply by sliding the ice-filled carton longitudinally rearward from the free end of the platen while the operator holds one hand pressing upwardly upon the secured flaps and supporting the weight of the ice until the carton is turned to bring the folded flaps at the normal top of the carton uppermost. The remaining end-flap 69 may then be folded over and secured by staples 70 to complete the operation.

The specific means of securing the flaps of the carton are not important nor need they be secured necessarily as the package may be removed with the contents intact by the operator holding the same firmly by one hand while the carton is being removed from the platen and uprighted. I have shown, however, through somewhat conventionally stapling apparatus at 71 which is actuated by a foot-lever 72 and presses the staples through the three folded flaps originally closing the carton to be clinched if desired against the underside of the platen. The staples 70 may be secured by hand-stapling means, not shown.

Ayers and Schwimmer's pending application, Serial No. 24,576, filed June 1, 1935, illustrated in Fig. 17 and described ice-cutting apparatus germane to the present application and invention, herein shown in Fig. 8. Upon requirement for division made by the Patent Office claims for such apparatus were cancelled subject to the right to make the same in a subsequent related application and the inclusion of said form of the invention in the present application is made in accordance with such right, this application being a continuation-in-part of the above-identified Ayers and Schwimmer application.

Referring to Fig. 8 of the drawings illustrating a modified form of my invention and embodying subject matter divided out of the above mentioned prior patent application, the reference numeral 80 indicates the horizontal bed of the machine supported on legs 81. Longitudinally directed ridges may be formed on the upper surface of said bed, or, as shown, a plurality of parallel slats 82 are set on edge and rigidly connected to the bed having spaces or grooves 83 therebetween.

A grid-frame 85 is mounted over said bed and is hingedly connected at 86 to one edge thereof. Electrical-resistance wires 87 are provided for said grid-frame herein shown as extending longitudinally in alignment, respectively, with the spaces 83, and as the height of the slats 82 is approximately equal to the thickness of the grid-frame the wires will extend into said spaces below the plane of the slats when the grid has reached the lower end of its travel to rest upon the bed so that a cake of ice 88 resting upon the slats will be fully cut through by the heated wires, thus cutting the cake into slabs or blocks according to the arrangement and number of wires utilized.

In the present showing the only addition has been to provide counterbalancing means for the grid-frame consisting of a pair of rods 90 extending rearwardly from the frame beyond the hinge-connection 86 and each bearing an adjustable weight 91 that may be set and secured by screws 92 in an obvious manner to regulate the effective weight of the grid-frame upon the ice-cake.

A further modified form of the invention is illustrated in Figs. 10 to 12, inclusive, and is adapted to sever ice-cakes, as 95, into smaller blocks. Said ice-cakes are usually of approximately three hundred pounds weight as they are taken from the cans in which the ice is formed according to the practice commonly followed in the manufacture of ice for commercial use.

In said views a wooden base 96 is mounted and secured upon the floor within an angle-bar frame 97. Said base is of rectangular configuration and proportioned to support a full cake 95 of ice thereon and is desirably of approximately the same dimensions as said cake when lying on its side. A relatively shallow groove 98 is formed in the upper surface of said base in the longitudinal axis thereof and a plurality of similar grooves 99 are formed transversely therein in equally spaced relation and extending to greater depths in the base than said longitudinal groove. The ice-supporting surface of said base lying in a horizontal plane is thus divided into a plurality of rectangular sections 100 and with five transverse grooves 99 as illustrated in Fig. 12 and according to the usual practice said sections will correspond respectively with the shape and dimensions in plan of the twelve twenty-five pound ice-blocks into which a cake of ice is commonly cut for packaging.

Rigidly mounted on each of the end-flanges 101 of the frame 97 are a pair of metal sockets 102 arranged and adapted to receive respectively removable cylindrical posts 103 having tapered lower ends 105 with which said sockets correspond and above said tapered ends each post is formed or provided with a circular flange 106. The upper end of each said post terminates in a stop-cap 107.

A grid-frame is mounted to move vertically on the posts 103 and consists of channel-bars 108 forming the side members of the frame and similar bars 109 connecting them at their ends and in rectangular relation through bolts 110. The end bars 109 are apertured to receive the posts 103 and tubular guide-sleeves 111 are rigidly connected to said bars and are similarly slidable along said posts to guide the movements of the frame in level condition therealong.

The opening provided within the grid-frame is extensive to encompass and include the base 96 therein when lowered to its lowest point of travel as when it rests upon the post-flanges 106. Terminal blocks 112 are mounted under the end bars 109 with which an electrical-resistance wire 113 is connected in the longitudinal axis of the frame corresponding in position with the groove 98 in the base. Similar blocks 115 are mounted under the side bars 108 in pairs to which similar wires 116 are connected corresponding in position to the respective grooves 99 in the base. In Figs. 10 and 11 I have shown but two such corresponding grooves 99 to illustrate the division of a cake of ice into but six parts or blocks of fifty pounds each. It will be understood that the number, arrangement and position of the respec-

tive cutting wires may be varied according to the requirements.

After a cake of ice, as 95, has been cut the grid-frame is raised by the operator through the two handles 117 by sliding the frame upwardly along the posts 103, substantially as shown in Fig. 10, whereupon the sleeves 111 will engage the caps 107 and the frame and posts together may be removed from the base and set to one side. The severed ice-blocks may then be removed and a new ice-cake 95 positioned symmetrically upon the base 96. The frame and posts are then moved over and the posts inserted within the sockets 102 whereupon the frame may be lowered upon the ice-cake.

Electrical current, supplied through a suitable flexible cable, not shown, may then be switched on and the wires 113 and 116 which may be connected in series in a circuit are heated thereby. The radiant energy thus produced causes the ice to melt away in the path traveled by the wires in the gravitational movement of the grid-frame towards the base rapidly severing the ice into blocks of even or desired sizes. The downward travel of the grid-frame is sufficient to cut the ice completely through, to allow for which purpose the grooves 98 and 99 are provided.

Having described my invention, what I claim, is:

1. In ice-cutting apparatus, a horizontal bed-plate, and a grid-frame guided in gravitational movements above said bed-plate and provided with electrically heated wires to contact a cake of ice supported on said bed-plate, an inclined feed chute connected to said bed-plate to direct an ice block onto said bed-plate, and means on said chute and bed-plate to engage the underside of an ice block moving onto said bed-plate to guide the ice block to a predetermined position beneath said grid frame.

2. In an electrical ice cutting machine, a base member for supporting a cake of ice, an electrically heated grid, a frame for supporting said grid, and hinge means for supporting said frame on said base member for arcuate cutting movement of said grid from a position above and at an angle to said base member into a position flat on said base member, said base member being grooved on its upper surface to receive said grid.

3. In an electrical ice-cutting machine, in combination with a horizontal base to support a block of ice, and an ice-cutting grid mounted and arranged to descend by gravity upon said block and provided with electrically heated wires to divide said block, of spring-pressed means extending through said base and engageable with the underside of said block to secure the block in fixed position during said cutting operations.

4. In an electrical ice-cutting machine, in combination with a horizontal base to support a block of ice, and an ice-cutting grid mounted and arranged to descend by gravity upon said block and provided with electrically heated wires to divide said block, of means to secure said ice-block in fixed position during said cutting operations consisting of a vertically movable frame mounted below said base including a plurality of pointed instruments adapted to extend through said base and to engage said ice-block, spring-pressed means to urge said frame upwardly, and means to depress said frame and disengage said instruments from said ice-block.

5. An electrical ice-cutting machine, comprising a horizontal bed-plate for supporting a block

of ice and having a plurality of grooves therein extending below the ice-supporting surface, and a grid-frame provided with a series of electrical-resistance wires for cutting a block of ice supported on said bed-plate and mounted for substantially vertical movements to cause said wires to melt their way through said block and enter said grooves, respectively.

6. An electrical ice-cutting machine, consisting of a base for supporting a cake of ice having longitudinal and transverse grooves formed therein extending below the ice-supporting surface thereof, and a grid-frame including a plurality of electrical-resistance wires for cutting said ice-cake extending longitudinally and transversely of said frame and mounted to move by gravity toward said base to cause said wires to enter said grooves, respectively.

7. An electrical ice-cutting machine, consisting of a base having longitudinal and transverse grooves formed therein, a plurality of sockets on said base, a plurality of posts detachably mounted in said sockets, respectively, a grid-frame slidably mounted on said posts to move by gravity towards said base and provided with a series of electrical-resistance wires to melt into a cake of ice supported on said base to divide the same, said wires being disposed in longitudinal and transverse directions corresponding to said base-grooves and arranged to enter the same in the lowermost position of the grid-frame.

8. In a device of the character described, a base member for the support of a cake of ice, a plurality of ribs arranged longitudinally on said base member to support the ice above said base member, a grid above said base member comprising electrically-heated wires to sever said cake of ice, and means to guide said grid onto an ice block supported on said base member, said grid wires being arranged parallel to said ribs and in vertical alignment with the areas between said ribs, respectively.

9. In a device of the character described, a base member having a plurality of cutting ribs arranged longitudinally on said base to support the ice above said base and partially cut the ice, and a plurality of cutting members disposed above said base movable against the ice to sever the ice through a plurality of planes in vertical alignment with said ribs, respectively.

10. In a device of the character described, a base member for the support of an ice block, means associated with said base member to engage the underside of an ice block supported on said base member and maintain the ice against lateral movement in any direction, a cutting grid comprising a plurality of electrically-heated wires disposed above said base member, and means to guide said grid onto an ice block supported on said base member.

11. In an electric ice cutting machine, a bed-plate provided with guide wires adapted to melt into an ice slab to aid in securing said slab in position for cutting, a platen to receive from said bed-plate ice slabs in stacked relation, said platen being spaced from said bed-plate and being provided with extensions of said guide wires.

12. In an electric ice cutting machine, a grid comprising a series of electrical resistance wires for cutting a block of ice, and a base member for supporting an ice block during cutting, said base member being grooved on its upper surface to receive the cutting wires of said grid.