F. E. LAVERTY.

ICE HARVESTER.

APPLICATION FILED JULY 16, 1909.

961,781.

Patented June 21, 1910.

3 SHEETS—SHEET 1.

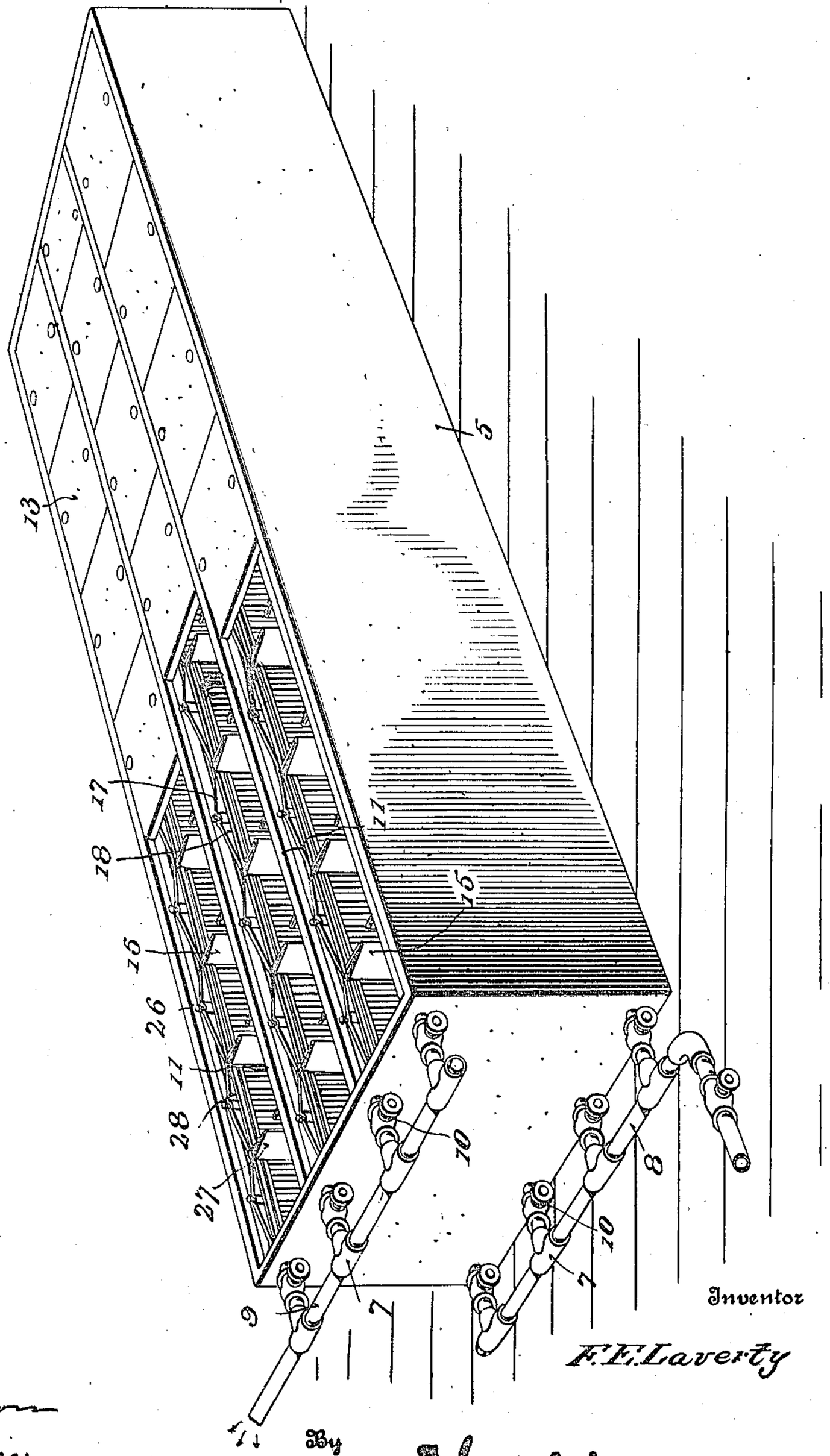


Fig. 1.

Witnesses

W. P. Woodson

Juana M. Fallin.

F. E. LAVERTY.

ICE HARVESTER.

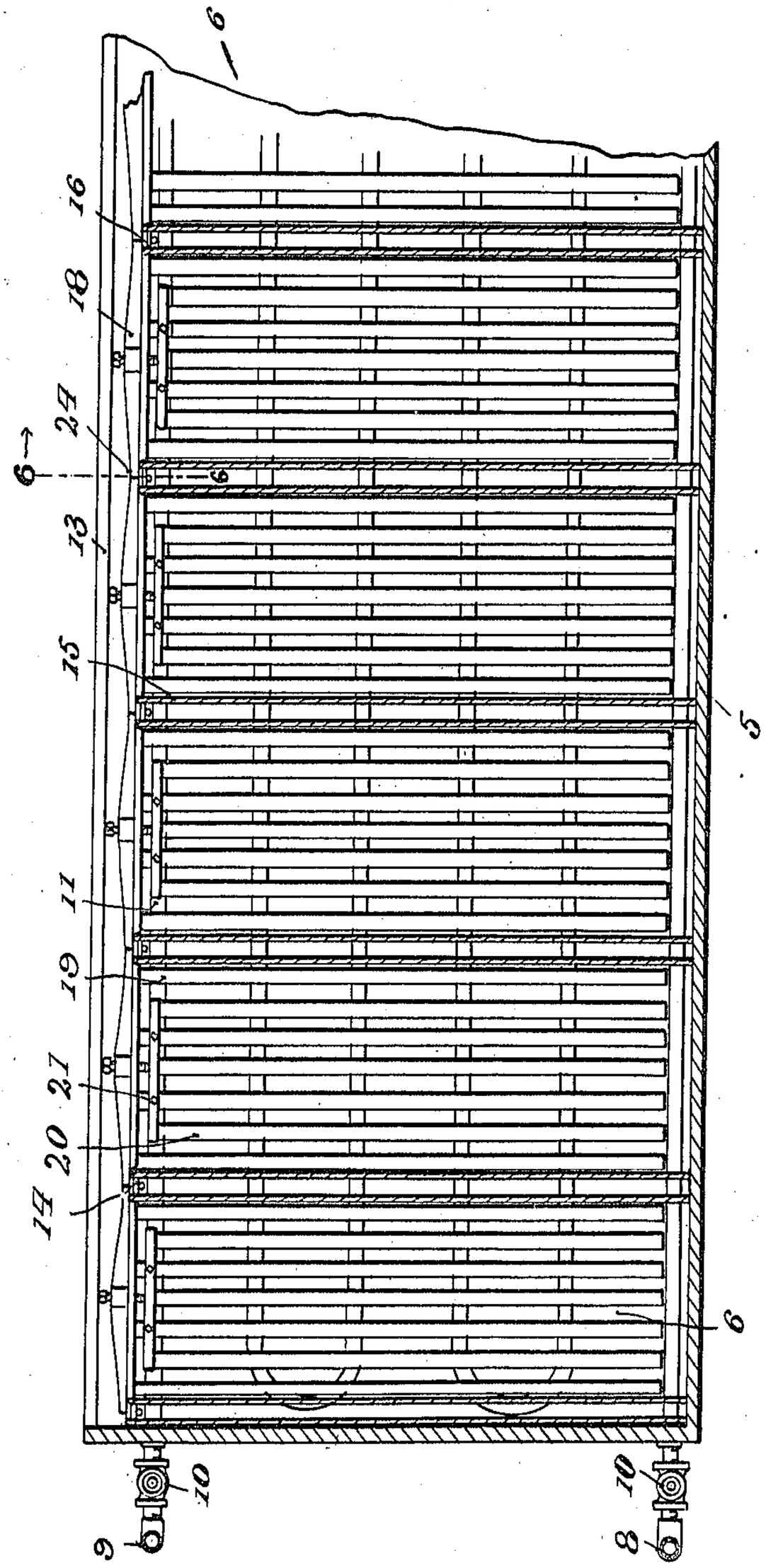
APPLICATION FILED JULY 16, 1909.

961,781.

Patented June 21, 1910.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

W. F. Woodson.

Juana M. Fallin,

Inventor

F. E. Laverty

By A. H. Kacey, Attorneys.

F. E. LAVERTY.

ICE HARVESTER.

APPLICATION FILED JULY 16, 1909.

961,781. Patented June 21, 1910.

3 SHEETS—SHEET 3.

Fig. 3.

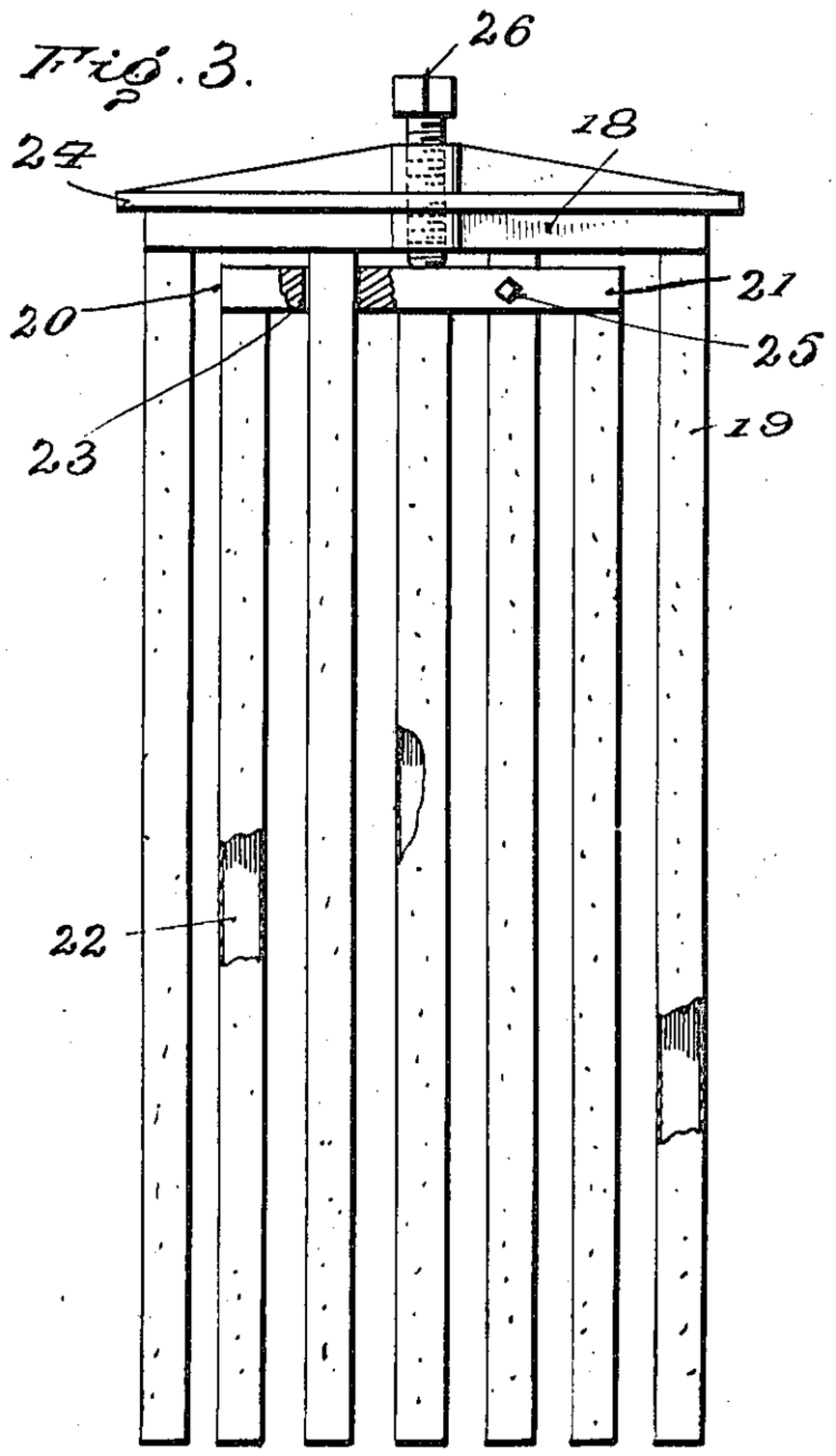


Fig. 4.

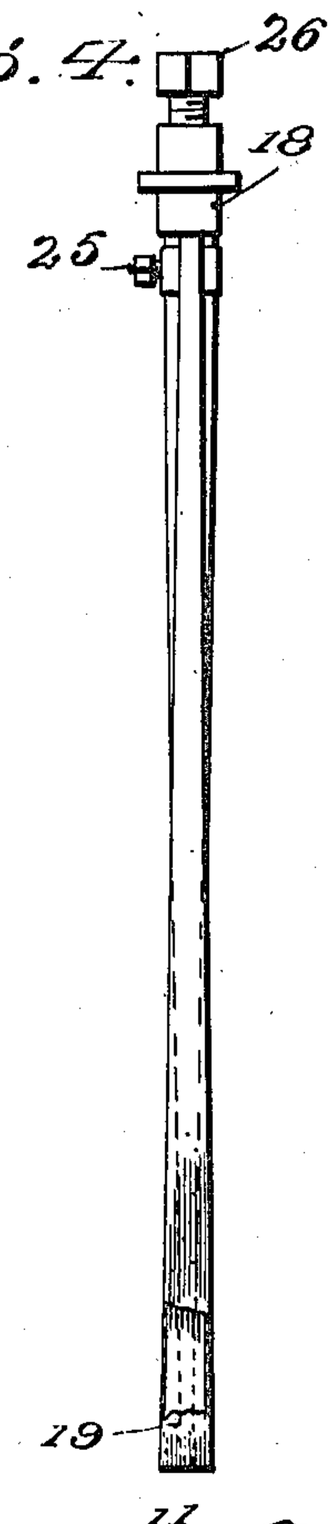


Fig. 5.

Fig. 6.

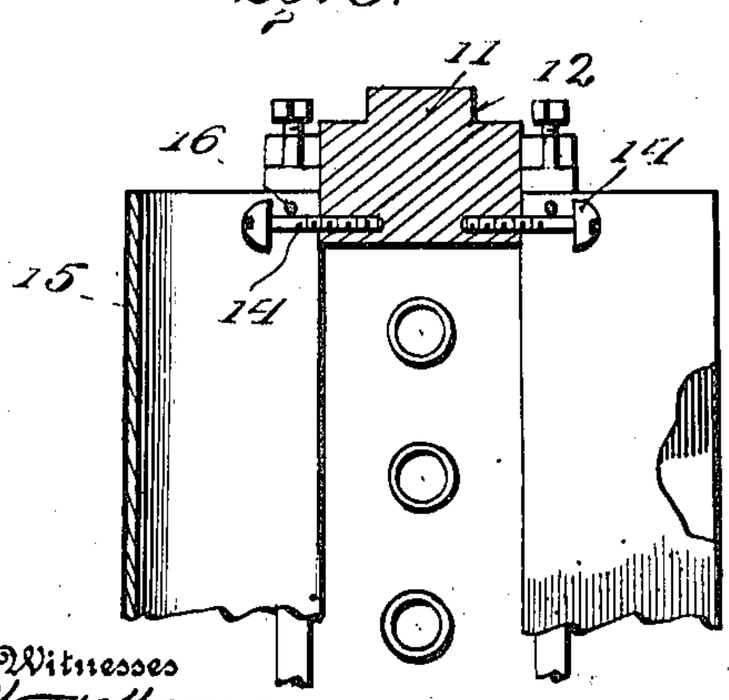
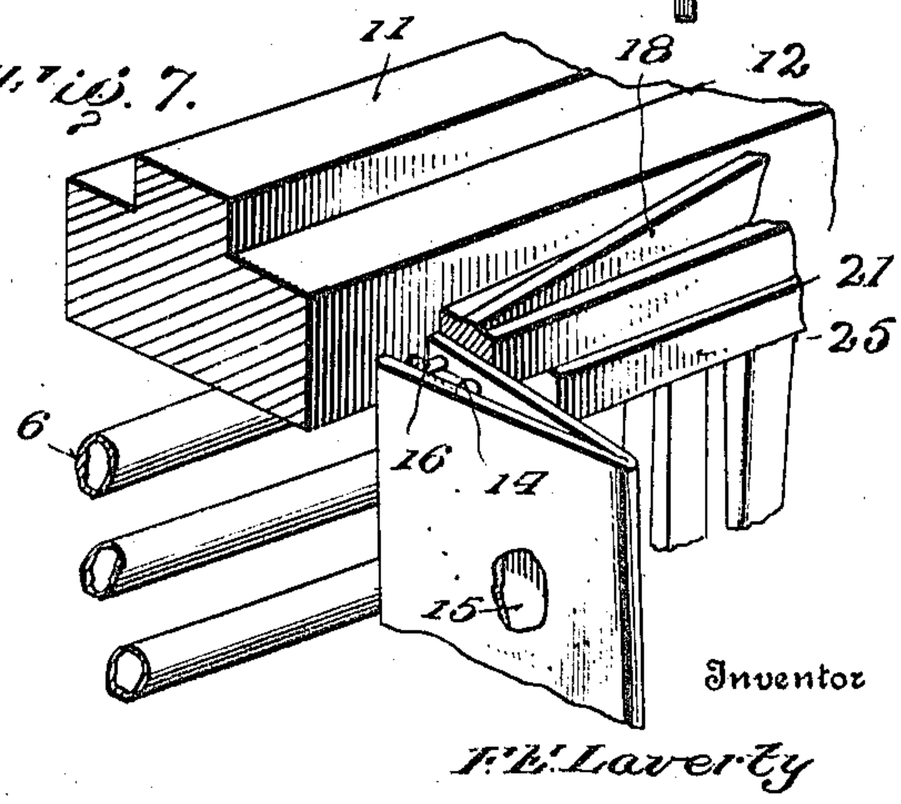


Fig. 7.



Witnesses

W. F. Woodcock.

Juana M. Fallin,

Inventor

F. E. Laverty

By H. A. H. Racey, Attorneys.

UNITED STATES PATENT OFFICE.

FRANCIS E. LAVERTY, OF WORCESTER, MASSACHUSETTS.

ICE-HARVESTER.

961,781. Specification of Letters Patent. Patented June 21, 1910.

Application filed July 16, 1909. Serial No. 507,956.

To all whom it may concern:

Be it known that I, FRANCIS E. LAVERTY, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Ice-Harvesters, of which the following is a specification.

This invention relates to harvesters for ice making machines and more particularly to mechanism especially designed for harvesting ice manufactured by the open tank system.

Heretofore in the manufacture of ice by the open tank system, it has been the practice to harvest the ice by the application of heat in some form to the cooling surface, such for instance, as the introduction of hot water or gas to the interior of the cross cut devices, or, by the passage of a current of electricity through the cooling surface to effect the thawing of the film of ice at said cooling surface and thus permit the removal of the cakes or blocks of ice formed in the tank. Such a method of harvesting ice is not only expensive, but, by reason of the low temperature of the water in the tank, large quantities of heat units are absorbed and the water thus partially heated, has a tendency to melt the ice at the top of the tank with the result that the efficiency of the plant is materially reduced.

The object of the present invention is to obviate the heating of the water in the tank during the harvesting operation and consequently increase the efficiency of the plant by coating the cross cut devices and other cooling surfaces with an application of paraffin, wax or similar substance, prior to the admission of the refrigerant to the cooling coils.

A further object of the invention is to effect the fracture of the ice by the application of lateral pressure to the ice where the latter forms on the cooling surfaces, thus to effect the ready removal of the blocks or cakes without the necessity of cutting the ice or heating said cross cut devices and cooling surfaces.

A further object is to provide a harvester including co-acting wedge-shaped separating members adapted to be positioned in the tank between the cross cut devices or partitions thereof and having their exposed faces covered with paraffin or other material to prevent adhesion of the ice thereto, means being provided for moving said members in opposite directions to dislodge the ice formed on the cooling surfaces.

A further object is to provide improved means for suspending the cross cut devices or partitions within the tank, said cross cut devices serving to support the wedge-shaped separating members in operative position.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions, and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of an ice making machine showing the harvester constructed in accordance with my invention; Fig. 2 is a longitudinal sectional view of the same; Fig. 3 is a front elevation of one of the separating members removed from the tank, the co-acting sections comprising the separating member being shown in assembled position; Fig. 4 is an edge view of Fig. 3; Fig. 5 is a similar view showing the upper and lower sections of the separating member adjusted longitudinally to exert a lateral pressure on the ice; Fig. 6 is an enlarged transverse sectional view taken on the line 6—6 of Fig. 2; Fig. 7 is a detail perspective view of one of the longitudinal beams showing the manner of supporting the cross cut devices and separating members in position thereon.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The improved harvester forming the subject matter of the present invention, is shown by way of illustration in connection with an open tank ice making machine, in which 5 designates the water receiving tank or receptacle and 6 the freezing coils extending longitudinally of the tank and connected through the medium of couplings 7 with an inlet pipe 8 and an outlet pipe 9, there being

suitable valves 10 arranged near each coupling member 7 for controlling the flow of brine, anhydrous ammonia or other refrigerant through the freezing coils.

Disposed within the tank 5 above the central freezing coils 6, are longitudinal beams 11 having their opposite ends rabbeted at 12 to form seats for suitable plates 13 constituting the top or cover of the tank, the outer row of plates 13 resting on the upper longitudinal edges of the side walls of the tank, as shown. Extending laterally from the opposite edges of the longitudinal beams 11 are spaced pins or projections 14, from which are suspended the cross cut devices, indicated at 15.

The cross cut devices 15 are preferably wedge shaped in cross section and formed of metal or other suitable material, there being transverse pins 16 connecting the converging walls of the cross cut devices at the upper ends thereof and adapted to rest on the pins 14 for supporting the members 15 within the tank 5, as shown in Fig. 6 of the drawings.

The exterior or exposed surfaces of the cross cut devices 15 are coated or otherwise treated with an application of paraffin, wax or other suitable material to prevent the adhesion of the ice on said cross cut devices during the freezing operation and thus to permit harvesting of the ice and the removal of the cross cut devices without applying heat thereto for the purpose of thawing the thin film of ice at said cross cut devices.

Interposed between the cross cut devices 15, on opposite sides of the longitudinal beams 11, are separating members 17, each preferably formed in two sections, the upper section of which comprises a transverse head 18 having spaced depending wedge shaped bars 19 secured thereto and gradually increasing in thickness from the head 18 to the lower ends of the bars. The lower section 20 of each separating member is also provided with a transverse head 21 from which depend a plurality of spaced wedge shaped bars 22 gradually decreasing in thickness from the head 21 to the lower ends of the bars 22, there being suitable openings 23 formed in the head 21 of the lower separating section to permit the passage of the bars 19 of the upper separating section. The bars 19 of the upper separating section and the bars 22 of the lower separating section, are also coated with a layer of paraffin, wax or similar material to prevent the ice adhering thereto during the freezing operation. The opposite ends of the heads 18 of each separating member, are extended longitudinally to form supporting lips 24 which bear against the adjacent cross cut devices 15 and by means of which the upper section of each separating member is suspended within the tank, the lower section of each separating member being retained in operative relation to the upper section thereof by set screws or similar fastening devices 25, the latter being carried by the head 21 and adapted to bear against the depending bars 19 of the adjacent separating section.

The head 18 of each separating section is provided with a vertical opening, the walls of which are threaded for engagement with a bolt or screw 26, the lower end of the bolt 26 being adapted to bear against the head 21 of the adjacent lower section 20 for the purpose of moving said sections in opposite directions, thus to exert a lateral pressure on the ice at the separating member and effect the fracture of the ice so as to permit the removal of the cakes or blocks from the tank.

The taper of the bars 19 is very gradual, said bars being preferably one-eighth of an inch thick at the head 18 and three-sixteenths of an inch thick at the terminals thereof, while the upper ends of the bars 22 are preferably three-sixteenths of an inch at the head 21 and one-eighth of an inch at the lower ends thereof. Thus it will be seen that when the screw 26 is rotated, the upper section 17 will move upwardly and the lower section 20 downwardly within the tank, thus to a slight degree increasing the thickness of the separating members and causing the lateral pressure exerted by the separating members to effect the fracture of the ice, in the manner before stated. Similar cross cut devices 27 are suspended from the side walls of the tank 5 and between which are interposed separating members 28 similar in construction to the separating members 17. If desired, suitable freezing plates may be interposed between the separating members and the freezing coils 6, and in some cases, one or more plates covered with paraffin, wax or the like, may be positioned in the bottom of the tank to prevent the ice from adhering thereto during the freezing operation.

In operation, the cross cut devices 15, previously coated in the manner before stated, are suspended from the pins 14, after which the separating members, also coated with paraffin or the like, are suspended from the cross cut devices by means of the lips 24. The tank being filled or partially filled with water, brine, anhydrous ammonia or other refrigerant is admitted to the freezing coils through the inlet pipe, and the freezing operation commences. After the ice is formed in the tank 5, the operator rotates the screws 26 with a suitable tool, thus forcing the upper and lower sections of each separating member in opposite directions and exerting a lateral pressure on the cake or block of ice adjacent said separating member so as to fracture the ice and permit its removal from the tank, this being readily accomplished

inasmuch as the ice is already partly severed or fractured by the bars 19 and 20. By reason of the coating of paraffin or like substance on the cross cut devices and separating members, the ice is prevented from forming thereon so that the ready detachment of the blocks of ice is effected without the application of heat in any form to the cross devices or separating members, thus preventing partial heating of the water in the tank and materially increasing the efficiency of the plant.

Having thus described the invention, what is claimed as new is:

1. In an ice making machine, a cooling element, a separating member disposed at the surface of said cooling element, and means for varying the thickness of the separating member thereby to exert a lateral pressure on the ice.

2. In an ice making machine, a cooling element having its surface coated to prevent the adhesion of ice thereto, a separating member disposed at the surface of said cooling element and also having its exposed face coated to prevent ice adhering thereto, and means for varying the thickness of said separating member to exert a lateral pressure on the ice.

3. In an ice making machine, a cooling element, cross cut devices disposed at the surface of said cooling element, a separating member interposed between the cross cut devices and means for varying the thickness of the separating member, thereby to exert a lateral pressure on the ice.

4. In an ice making machine, a cooling element, cross cut devices disposed at the surface of said cooling element and coated with a compound to prevent ice adhering thereto, and co-acting wedge shaped separating members having a similar coating interposed between the cross cut devices and movable in opposite directions to exert a lateral pressure on the ice.

5. In an ice making machine, a tank, a cooling element disposed within the tank, cross cut devices disposed at the surface of the cooling element, and co-acting wedge shaped separating members interposed between the cross cut devices.

6. In an ice making machine, a tank, a cooling element disposed within the tank, cross cut devices extending laterally from the surface of the cooling element and having their exposed faces covered with wax, and coacting wedge shaped separating members interposed between the cross cut devices and also coated with wax.

7. In an ice making machine, a tank, a cooling element disposed within the tank, cross cut devices extending from the surface of the cooling element, co-acting wedge shaped separating members interposed between the cross cut devices, and means for moving the separating members in opposite directions, thereby to exert a lateral pressure on the ice.

8. In an ice making machine, a tank, supporting beams carried by the tank and provided with suspension devices, cross cut devices depending from the suspension devices, and separating members interposed between the cross cut devices and having their exterior faces provided with a coating to prevent the adhesion of ice thereto.

9. In an ice making machine, a tank, supporting beams carried by the tank, pins extending laterally from the supporting beams, substantially wedge shaped cross cut devices suspended from the pins and having their exterior faces provided with a coating to prevent the adhesion of ice thereto, and co-acting wedge shaped separating members interposed between the cross cut devices and movable in opposite directions, thereby to exert a lateral pressure on the ice.

10. In an ice making machine, a tank, a cooling element, a supporting beam disposed above the cooling element and provided with suspension devices, cross cut devices engaging the suspension devices, and co-acting wedge shaped separating members interposed between the cross cut devices and movable in a direction away from each other, thereby to exert a lateral pressure on the ice.

11. In an ice making machine, a tank, a cooling element disposed within the tank, a support arranged above the cooling element and provided with suspension devices, wedge shaped cross cut devices engaging the suspension devices, and a separating member interposed between the cross cut devices and including upper and lower sections having depending wedge shaped bars, one of said sections being provided with means for engagement with the other section, thereby to partially separate the sections and exert a lateral pressure on the ice.

12. In an ice making machine, a tank, a cooling element, and a separating member including co-acting wedge shaped sections movable vertically in opposite directions and having their exposed faces covered with wax.

13. In an ice making machine, a tank, a cooling element, and a separating member disposed at the surface of said cooling element and including upper and lower sections having depending wedge shaped bars tapering in opposite directions, and means carried by one of the sections and adapted to engage the other section for moving said sections in opposite directions, thereby to exert a lateral pressure on the ice.

14. In an ice making machine, a tank, a cooling element disposed within the tank, a separating member including co-acting sections each provided with a head, and a plurality of depending wedge shaped bars, there being openings formed in the head of one

section for the reception of the bars of the adjacent section, and means for separating said sections, thereby to exert a lateral pressure on the ice.

15. In an ice making machine, a tank, a cooling element disposed within the tank, a separating member including co-acting sections each provided with a head, and a plurality of depending wedge shaped bars, there being openings formed in the head of one section and adapted to receive the bars of an adjacent section, means for locking the sections in engagement with each other, and a screw carried by one of said sections and adapted to engage the head of the mating section for moving said sections in opposite directions when the locking members are released.

16. In an ice making machine, a tank, a cooling element disposed within the tank, a supporting bar arranged above the cooling element and provided with laterally extending pins, substantially wedge shaped cross cut devices having transverse pins for engagement with the pins on the supporting bar, and co-acting separating members, one of which is provided with laterally extending lips adapted to rest on the adjacent cross cut devices.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS E. LAVERTY. [L. S.]

Witnesses:
THOMAS F. DONOVAN,
EDMUND F. HUNT.