(No Model.)

L. DAFT.

MEANS FOR CUTTING ICE.

No. 508,819. Patented Nov. 14, 1893.

Fig. 1.

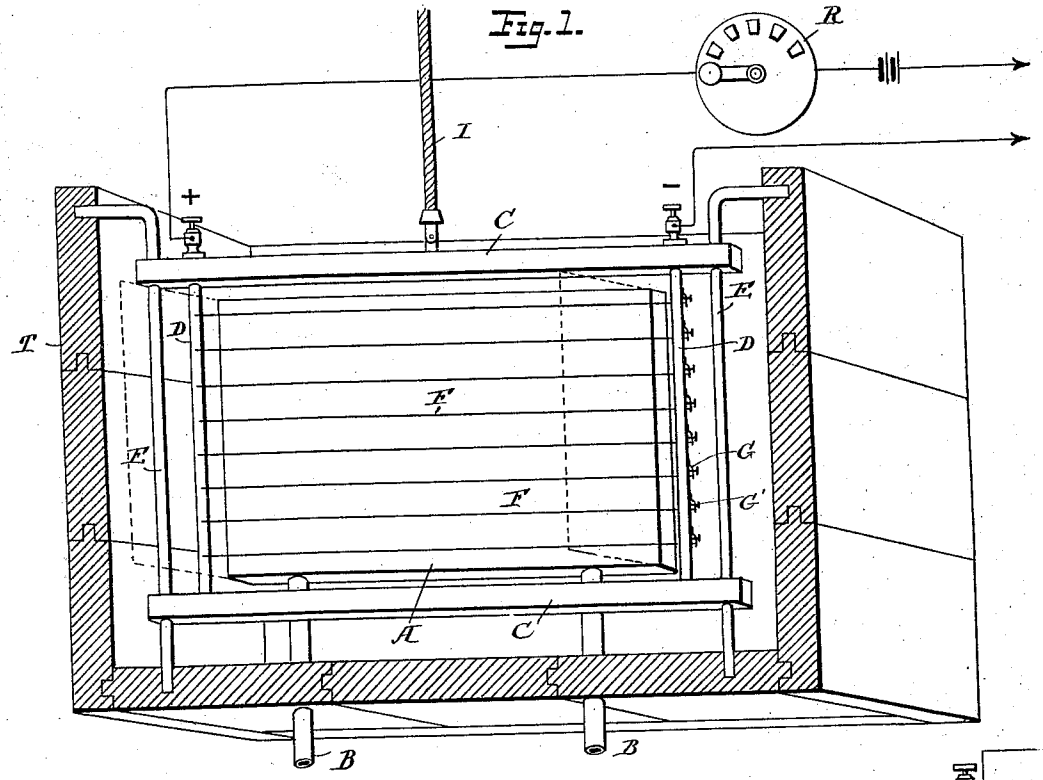


Fig. 2.

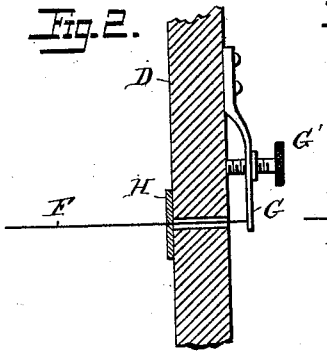


Fig. 3.

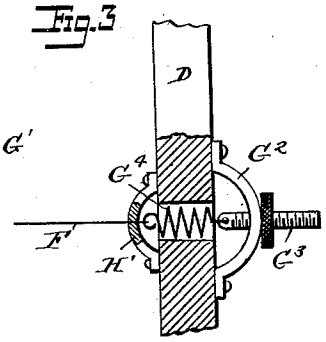


Fig. 6.

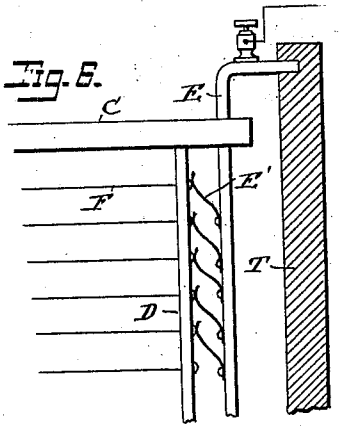


Fig. 5.

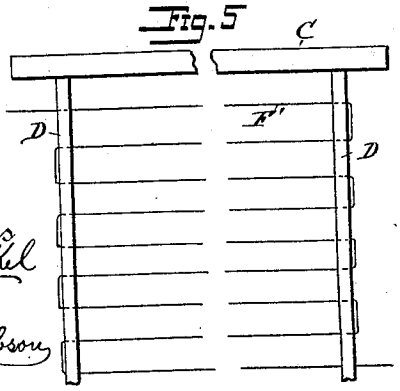
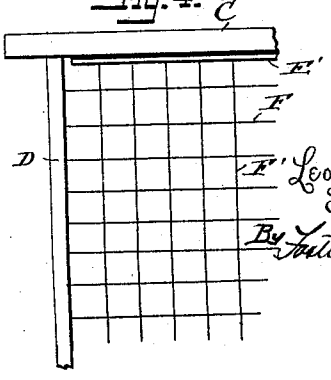


Fig. 4.



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MEANS FOR CUTTING ICE.

SPECIFICATION forming part of Letters Patent No. 508,819, dated November 14, 1893.

Application filed May 2, 1892. Serial No. 431,503. (No model.)

To all whom it may concern:

Be it known that I, LEO DAFT, a subject of the Queen of England, and a resident of Seattle, Kings county, Washington, have invented certain new and useful Improvements in Means for Cutting Ice, of which the following is a specification.

My invention relates to means for cutting ice, and while it may be applied in various ways, and for various purposes, it is more especially intended to be applied to separating cakes of ice from the so-called freezing plate in apparatus for artificially making ice.

It has for its object to provide means whereby the cake of ice may be quickly and easily separated from the plates, and separated into blocks of the proper size, and to these ends my invention consists in the various features of construction, arrangement, and mode of operation, substantially as set forth hereinafter.

Referring to the accompanying drawings, Figure 1, is a sectional perspective view of a tank of an ordinary ice machine showing sufficient to illustrate my invention. Figs. 2 and 3, are details on an enlarged scale showing means of attaching the wires. Fig. 4, is a view showing a different arrangement of the wires adapted more particularly for separating the cake of ice into blocks of the desired size; and Figs. 5 and 6 are modifications.

The manufacture of ice by artificial means is constantly increasing, and in carrying out this process, it is common to provide the ice forming machine with what is termed the freezing plate, which is supported in a tank of water, and forms a basis, to which the block or cake of ice is attached in the process of freezing. This is the common construction in general use, especially in the processes involving the use of anhydrous ammonia, or similar material, and it has been found exceedingly difficult to separate the ice from the freezing plate after it has once been formed. Various means have been suggested, all of which involve more or less loss of time and expense, and it is primarily with the object of overcoming these difficulties that my present invention is made.

In the accompanying drawings T, represents a portion of the tank or similar device in any ordinary freezing apparatus and mounted in this tank is a freezing plate or receiver A.

Of course it will be understood that there may be any number of plates, and they may be variously arranged according to the characteristics of the machine, but in general, these plates consist of a hollow body made of boiler iron, or some similar material, of the desired size and thickness, and they are usually supported in the tank in an upright or vertical position.

In the present instance I have shown the receiver plate A as supported by means of heavy iron tubes B, B, through which the ammonia or other freezing mixture may pass to and from the plate or receiver.

It is not deemed necessary to describe the operations of freezing, as they are well understood.

In carrying out my invention and applying it to such a device as that shown I provide a suitable framework as that shown comprising the bars C, C, which are made of some strong non-conducting material, preferably oak, and which are joined together at the ends by metallic or other rods D, D, thus forming a strong rigid frame. The rods or bars C, C, are shown as extending beyond the transverse rods D, and are provided with holes, so that the frame will slide or move upon the guide rods E, E, secured to the body of the tank in proper position, but of course it is understood that other equivalent means of guiding the frame can be adopted. This frame is provided with a number of cutting wires F, which are composed of some conducting material as iron or steel, and which are preferably coated with some conducting material, which is not usually affected by water, as tin, brass or copper, and while I prefer the wires made as described, as I have found that they can be made strong, of the proper conductivity, and not liable to be injured by the water, yet it is understood that other materials may be used, such for instance as aluminium, or other material, which has the proper conductive property to the required extent, and is not liable to destruction when exposed to moisture. These wires F are perfectly secured permanently to one of the transverse metallic bars D of the frame, while

their other ends are adjustably secured in the opposite rod D, and while various means may be applied, I have shown in Figs. 2 and 3 on an enlarged scale, devices which I have found practicable. Thus in Fig. 2, the wire F extends through an opening *d* in the bar D, and secured to the bar is a spring G, to which the end of the wire is attached, and this is provided with a thumb nut G′, by means of which the tension of the wire may be adjusted, and still allow for elongation and contraction under the influences of heat and cold. Attached to the bar D is a plate H, in which is a small hole to receive the wire F, and to serve as a guide to maintain it accurately in position, and prevent its being displaced under pressure.

In Fig. 3, I have shown a similar construction in which the bar D is provided with a curved plate G^2, through which passes a screw G^3, and interposed between this screw and wire F is a spring G^4 shown as a coiled spring, while the plate H′ serves as a guide or support for the wire F. I deem some sort of an adjustment like that described, or the equivalent thereof, quite important in order to keep the wires as near as possible under a uniform tension at the varying temperatures, so that the alignments of the various wires may be preserved.

In Fig. 4, I have shown a similar frame supporting the wires except that in addition to the longitudinal wires, there is a series of transverse wires F′, and these are supported upon, and connected to, the plates E′, E′ which are mounted on the non-conducting bars C, and preferably insulated from the transverse bars D. It is evident that the wires F′ should be in a plane parallel to, but not co-incident with the plane of the wires F, so that they will not contact and short circuit the wires.

In carrying out my invention as shown in Fig. 1, the frame carrying the wires is preferably raised by suitable means, as a rope I, and held in its upper position on the guide rods E, with the wires F close to the receiver or freezing plate A. The electrical connections are made in any usual way from any circuit, plus and minus representing the leading wires, and R a suitable rheostat and switch in the circuit, the leading wires being shown as connected to the binding post P, which are attached or in electrical connection with the transverse bars D, D. In this condition the apparatus is ready for operation, and the freezing is carried out in the usual way by the admission of the freezing mixture or gas to the receiving plate, and the water is congealed, and is deposited on the surface of the plate or receiver, embedding the wires F in the block of ice, and this continues until the block, which is represented by dotted lines in Fig. 1, is of the desired thickness. The circuit of the cutting wires is then closed by means of the switch or rheostat R, and the strength of the current is regulated thereby, and the current passes from the plus leading wire to the binding post connected to one of the transverse rods of the frame, and thence divides itself, passing through the cutting wires F in multiple to the other transverse rod D, and thence out by the minus conductor. This of course heats the wires, so that the ice in their immediate vicinity is melted. The cutting frame is now moved either up or down, by means of a rope or other device, causing the wires to melt the ice, and sever it from the receiving plate, when it may be removed from the tank. In practice I find it desirable to place the wires, say three inches apart, to move the frame first in one direction, and then in the other, and it is evident that as thus constructed a movement upward or downward from its central normal condition of an inch and a half, will completely sever the ice from the freezing block, and this can be done quickly and without the necessity of heating the receiver to any appreciable degree, or interfering with the operation of freezing to any extent, for as soon as the block is severed, the current is turned off, the block removed and the freezing operation continued as before.

In some instances instead of using separate wires, and connecting them with the conducting bar D, I use a single conductor F′, running over pins or through holes in the bars D as indicated in Fig. 5. It is also convenient to provide means for automatically breaking and making the electric circuit of the cutting wires by the movement of the carrying frame, and in Fig. 6, I have indicated one arrangement by which this can be carried out in which the wires F, projecting through the bar D, are moved into and out of contact with spring terminals E′ attached to the guide rod E for instance, which rod is connected to the circuit wire.

If it is desired to sever the large cake of ice into small pieces, I employ a frame constructed substantially as indicated in Fig. 4, having the cross cutting wires as well as the longitudinal wires, preferably being arranged at right angles and the current is connected so that the wires are arranged in multiple series, although of course they may be arranged in any other electrical connection, depending upon the character of the current employed, and the relative resistance of the cutting wires.

As the ice is formed on both sides of the receiving block, it is evident that another frame having another set of wires may be used on the other side, or which is preferable in many instances, the frame may have two sets of wires arranged on opposite sides of the receiver, so that the two cakes, one on either side of the receiver or freezing plate may be cut off simultaneously.

Other details of construction and arrangement will suggest themselves to those skilled in the art in applying my invention to different forms of freezing apparatus, and while I have shown it embodied in a well known

form, I do not limit myself to such a construction, as the details can be varied without departing from the spirit of my invention.

What I claim is—

1. As a means for cutting ice the combination with the frame, of a series of independent conducting wires, devices for regulating the tension of each wire, and connections between all the wires and a source of electric energy, substantially as described.

2. As a means for cutting ice the combination with the frame having the transverse conducting bars, of a series of conducting wires connected to said conducting bars, tension devices mounted on one of the bars, and connected to the wire and connections between the conducting wires, and a source of electric energy, substantially as described.

3. The combination with the frame composed of the non-conducting longitudinal bars and conducting transverse bars, of the conducting wires connected to one of the bars, and spring connections between the wires and the other bar, substantially as described.

4. The combination with the frame composed of the non-conducting side bars and conducting transverse bars, of the conducting wires secured to one of the conducting bars, the other conducting bar being provided with openings for the passage of the wire, adjustable spring tension devices interposed between the conducting bar and wires, and a guide plate secured to the conducting bar, substantially as described.

5. The combination in an ice machine with the tank, a freezing plate, and connections for the freezing mixture, of a frame mounted in the tank, and carrying the conducting wires and means for moving the frame with relation to the tank, substantially as described.

6. The combination in an ice machine with the tank, the freezing plate, and connections for the freezing mixture, of guides secured to the tank, a frame mounted on said guides, a series of conducting wires supported in the frame adjacent to the sides of the plate, and means for moving the frame with relation to the plate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEO DAFT.

Witnesses:
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IRA D. BRONSON.