May 14, 1957 I. HENNIG 2,791,887

ICE PARTICLES STORAGE AND DISPENSING DEVICE

Filed July 21, 1954 2 Sheets-Sheet 1

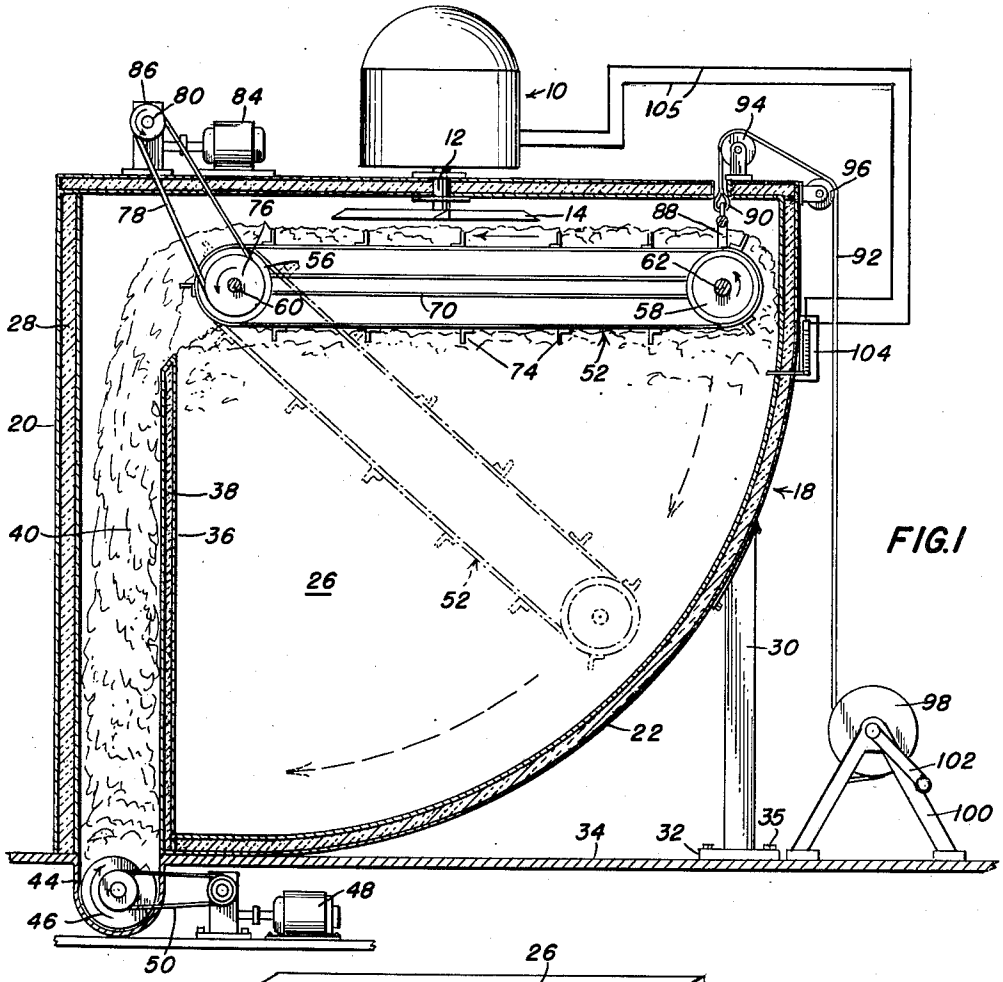


FIG. 1

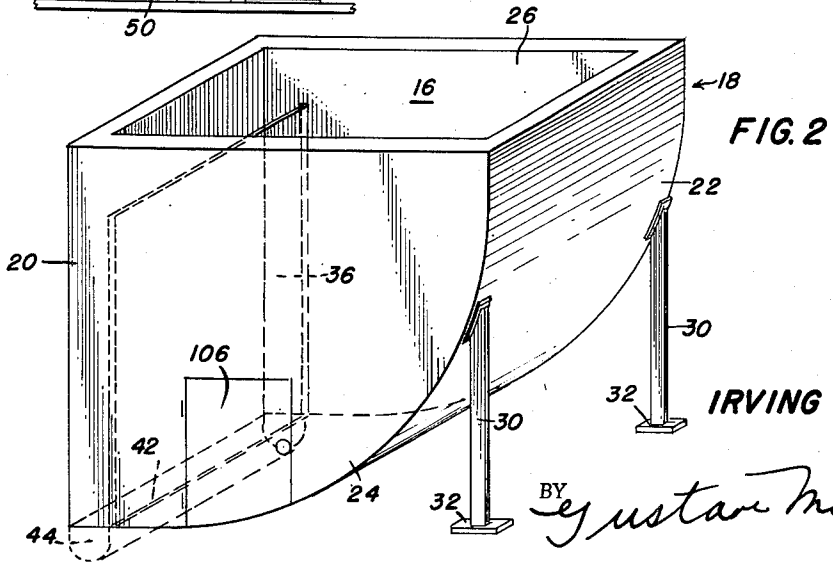


FIG. 2

INVENTOR
IRVING HENNIG

BY Gustave Miller
ATTORNEY

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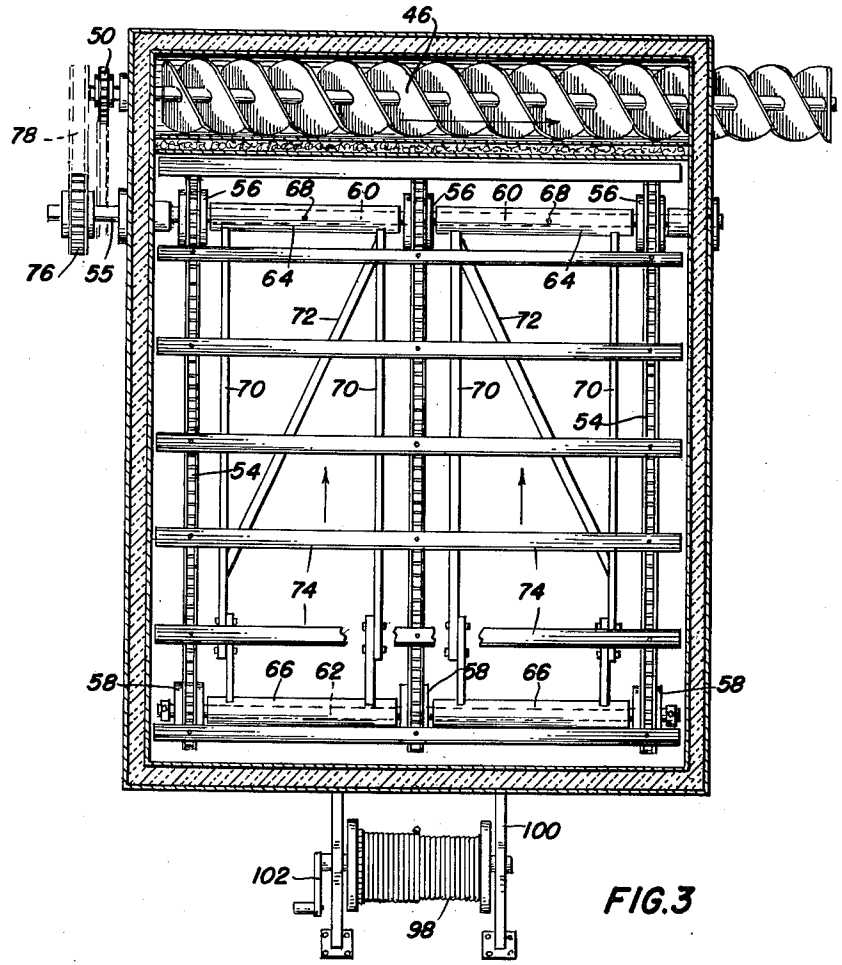


FIG.3

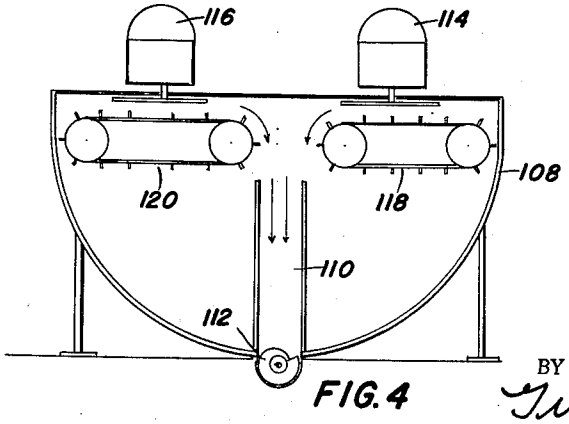


FIG.4

INVENTOR
IRVING HENNIG

BY Gustave Miller
ATTORNEY

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ICE PARTICLES STORAGE AND DISPENSING DEVICE

Irving Hennig, Biloxi, Miss.

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1 Claim. (Cl. 62—7)

This invention relates to apparatus for storing and conveying snow ice or flake ice particles, and it particularly relates to apparatus which is adapted to store the snow or flake ice particles for extended periods of time and which is adapted to convey the ice in snow or flake form from the storage area to a delivery point at any time and until all the ice has been removed from the storage area.

More specifically, this invention is concerned with the storage of snow or ice flake particles in a storage compartment and with the removal of a desired quantity of ice flakes from the storage compartment to a fishing boat, freight boat, freight train or the like.

Heretofore, it was necessary to manually remove the ice particles from the refrigerated storage bin, place them in wheel-barrows and then roll them to a conveyor which, in turn, carried them to the loading station. However, in addition to the necessity for using a large amount of manual labor with the accompanying inefficiency and expense, there was also the problem of chopping the ice flakes apart so that they could be removed. This problem arose because the flakes constantly melt slightly and then freeze together during storage. This chopping step, involved additional waste of labor and expense and made the storage of ice flakes very uneconomical and inefficient.

In order to obviate the above disadvantages, it is one object of this invention to provide storage and conveying apparatus which is capable of storing ice flakes for any desired time and which is nevertheless, capable of delivering predetermined amounts of the ice flakes in unamalgamated condition to a loading station.

Another object of this invention is to provide storage and conveying apparatus which is capable of delivering predetermined amounts of the ice flakes, up to the limit of the storage facilities of the apparatus, without any waste.

Another object of the invention is to provide a storage and conveying apparatus which eliminates the inefficiency and lack of economy due to the use of excessive manual labor.

Other objects of this invention are to provide an improved apparatus of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, this invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

Fig. 1 is a vertical sectional view of a device embodying the present invention.

Fig. 2 is a perspective view of a part of the device of Fig. 1.

Fig. 3 is a top plan view of the device of Fig. 1.

Fig. 4 is a vertical sectional view of a second embodiment of the invention.

Referring now in greater detail to the drawings wherein similar reference characters refer to similar parts, Fig. 1

shows an ice-flaking machine, generally designated 10. This flaking machine has not been illustrated in detail since it is of a type generally in use and, by itself, forms no part of the present invention.

The ice flakes are delivered from the machine 10 through the conduit 12 to a laterally elongated nozzle 14 which extends through the open top 16 of a refrigerated bin or hopper, generally designated 18. The bin 18 comprises a straight end wall 20 and a curved end wall 22 which extends from the bottom of end wall 20. A pair of opposite side walls 24 and 26 extend between the end walls. The walls 20, 22, 24 and 26 are each double-walled and are provided with suitable heat insulation, such as shown at 28, between the double walls. The curved end of the bin is supported by angle-iron legs 30 having feet 32 which are bolted to the floor 34, as at 35. The other end of the bin is supported directly on the floor.

A straight wall 36 is provided within the bin in spaced relation to the wall 20. The wall 36 is only partially the height of the wall 20 and is also double-walled and provided with insulation, as indicated at 38. Between the walls 20 and 36 is formed a chamber 40 and at the bottom of the chamber 40 the bin is provided with an elongated opening 42. An elongated trough 44 is positioned under the opening 42. The trough is open at one end and is provided with a screw conveyor 46 extending through the open end, as best shown in Fig. 3, for a purpose to be hereinafter set forth. A motor 48 is provided to actuate the screw conveyor 46 through a drive sprocket arrangement, generally indicated at 50.

Within the bin 18, at the upper portion thereof and underlying the nozzle 14 is an endless belt generally designated 52. The belt 52 includes a plurality of laterally spaced chains 54 movable between the sprockets 56 and 58. The sprockets 56 are mounted on shaft 60 which is, itself, mounted between and supported in the side walls of the bin. The sprockets 58 are mounted on shaft 62, this shaft being unattached and freely movable between the walls of the bin. Two pipes or tubes 64 are rotatably arranged on the shaft 60 between the sprockets 56 and are provided with lubrication opening 68. Two similar tubes 66 are also arranged on shaft 62 between the sprockets 58. Extending between corresponding tubes 64 and 66, and fixed at their ends to these corresponding tubes are channel bars 70. Cross-struts 72 extend between adjacent bars 70 as added supporting and strengthening means. A series of angle bars 74 extend laterally between the chains 54.

Mounted on shaft 60 outwardly of the bin is a drive sprocket 76 which is driven by a motor 84 through a drive chain 78 mounted on a sprocket 80, the motor being connected to the sprocket 80 through a gear box 86.

The free shaft 62 of the conveyor is connected to a vertically movable hanger 88 which is connected, as at 90, to a cable 92. The cable 92 extends over idler pulleys 94 and 96, connected to the bin 18, and is connected at its other end to a winch 98. The winch 98 is mounted on a support 100 and is provided with an operating handle 102.

A thermometer 104 is provided on the bin at a predetermined level. This thermometer is connected by a suitable circuit 105 to the motor of the ice flaking machine 10. When the ice in the bin has reached the level of the thermometer, the change in temperature reflected in the thermometer acts through a solenoid or the like to actuate a switch which causes the motor of the ice flaking machine to stop. This limit which is placed on the level of the ice prevents the clogging of the conveyor which would, otherwise, cause undue strain thereon.

In operation, after the bin is filled with ice, when a loading operation is to take place, the motor 84 is actu-

ated and the conveyor **52** is rotated. The bars **74** act as scoops and scoop up the ice flakes from the top of the mass, convey them around, in the direction indicated by the arrow, to a position overlying the chamber **40**, and then, as the bars move around the sprockets **56**, they dump the ice flakes into the chamber **40**. Here they fall onto the screw conveyor **46** which conveys them to the loading station. As the operation continues, and as the ice mass decreases in height, the conveyor is pivoted automatically around the shaft **60** by the action of gravity to follow the level of the ice mass. The conveyor will, in this manner, always be in operative position relative to the top of the ice mass. The pivotal movement of the conveyor is indicated in dotted outline in Fig. 1. It should here be noted that even though, during a time interval, the ice flakes will tend to melt partially and then freeze together, the scooping action of the bars **74** will always act to break the ice up into flakes again. After all the ice has been removed from the bin, or any time before then, when it is desired to lift the free end of the conveyor back to horizontal position, it is merely necessary to operate the winch **98** by means of the handle thereon.

The above described mechanism is generally quite large and, therefore, a door **106** is provided to give access to the interior of the bin. If desired, the door **106** may be transparent to permit visual inspection of the interior of the bin or, if desired, a separate window may be provided.

Fig. 4 shows a modified form of the invention wherein there is provided a refrigerated bin **108**, a chamber **110** similar to chamber **40**, and a screw conveyor **112** similar to screw conveyor **46**. It differs from the first described form of the invention in that it comprises two ice flake machines **114** and **116** and two endless conveyors **118** and **120** which deliver to the common chamber **110** and screw conveyor **112**.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

A flake ice storage and dispensing device comprising a bin adapted to have ice flakes delivered thereto, said bin comprising an upstanding end wall, a second upstanding wall parallel to said first upstanding wall and of lesser height than said first upstanding wall, a curvilinear storage floor extending from the bottom of said second upstanding wall to the height of said first upstanding wall, side walls extending from said first upstanding wall to said curvilinear floor, said upstanding walls providing a discharge chute therebetween, a trough located at the bottom of said discharge chute, a screw conveyor in said trough dispensing through one end thereof, an endless belt conveyor, a plurality of scooping elements on said endless belt conveyor, said endless belt conveyor being pivotally mounted adjacent the top of said second upstanding wall and extending over said curvilinear storage floor and adapted to rest on the top of a flake ice mass on said curvilinear storage floor to follow the level of said ice mass as it varies, means to operate said endless belt conveyor to cause said scooping elements thereon to scoop flake ice from the ice mass in a direction away from its pivotal mounting to pick up ice flakes onto said endless belt conveyor and carry the ice flakes thereover to drop them in said discharge chute onto said dispensing screw conveyor in combination with a flake ice forming machine mounted thereover in operative relation to said bin for delivering ice flakes thereto, and a thermocontrol means mounted on said bin at a predetermined location for deactivating said ice flake forming machine when ice flakes delivered to said bin have accumulated to said predetermined location.

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