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L. S. KEILHOLTZ
 DEVICE FOR USING SOLID REFRIGERANT TO EFFECT
 RAPID COOLING OF SMALL ENCLOSED SPACES
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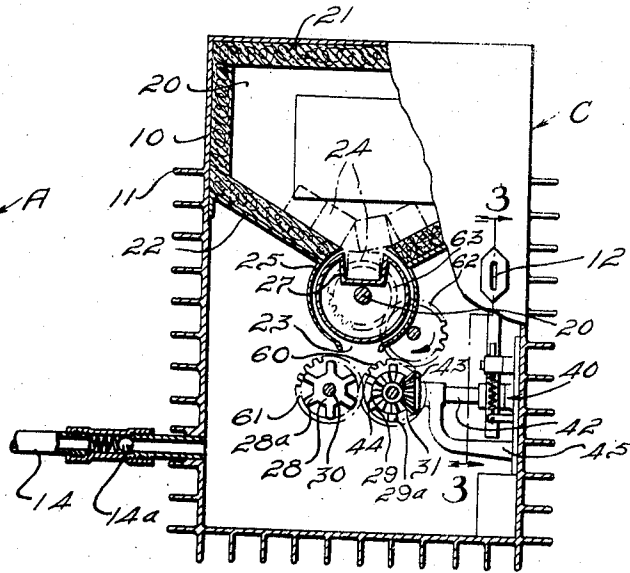
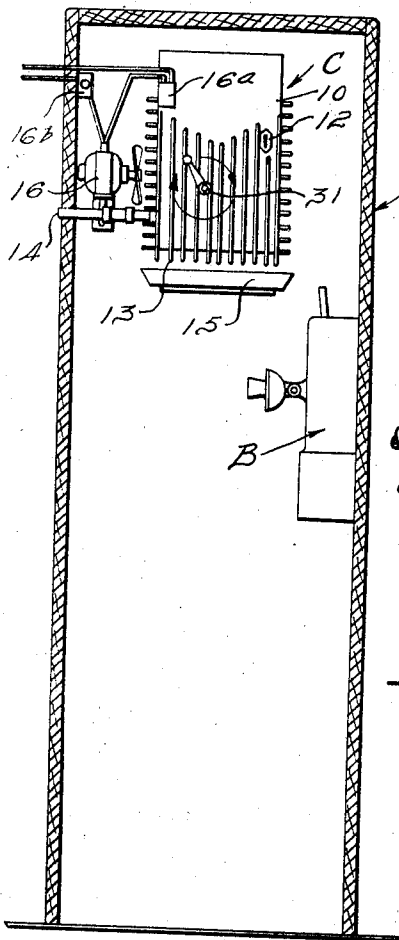


FIG. 2.

FIG. 1.

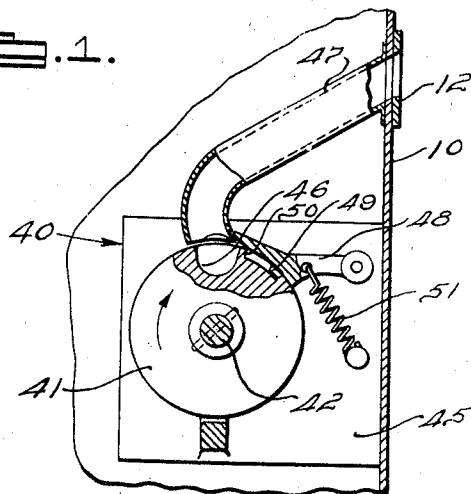


FIG. 3.

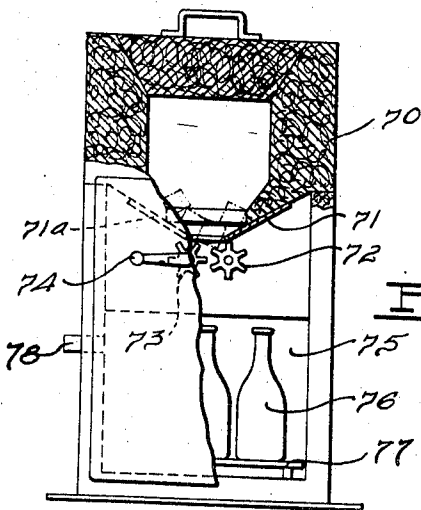


FIG. 4.

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DEVICE FOR USING SOLID REFRIGERANT
TO EFFECT RAPID COOLING OF SMALL
ENCLOSED SPACES

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6 Claims. (Cl. 62—91.5)

This invention relates to a device for using a solid refrigerant to effect the rapid cooling of small enclosed spaces. The solid refrigerant used may be solidified carbon dioxide or ordinary water ice or any other suitable material which is capable of absorbing heat while changing from the solid to the liquid or the gaseous form.

It is an object of the present invention to provide a device for the use of a solid refrigerant to effect the rapid cooling of small enclosed spaces such as telephone booths or similar enclosures and in which the solid refrigerant is crushed to form small solid particles which rapidly absorb heat from the surrounding space during the change of the particles from the solid to the liquid or gaseous form.

It is a further object of the invention to provide a device which may be actuated by a coin released locking mechanism in which a predetermined amount of a solidified refrigerant will be delivered from a magazine container and crushed between crushing rolls prior to its change in form and the attendant cooling effect derived therefrom.

A further object of the present invention is to provide a device for the use of a solid refrigerant to effect the rapid cooling of bottled beverages, food stuffs and the like.

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

Fig. 1 is a section through a telephone booth in which a device embodying the present invention is installed.

Fig. 2 is a detailed elevation with the face broken away of the cooling device shown in Fig. 1.

Fig. 3 is a fragmentary section taken substantially on the line 3—3 in the direction of the arrows of Fig. 2.

Fig. 4 is an elevation, with parts broken away to reveal the interior construction, of a modified form of device embodying the present invention and adapted particularly, but not exclusively, for domestic uses.

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

Referring to the drawing, particularly Fig. 1, there is shown an enclosed space A such as a telephone booth or the like which is likely to become very uncomfortable during the hot weather, due to the relatively small space enclosed therein and the lack of proper ventilation therefor. A telephone B is placed usually on one side wall of the booth A and the user stands or sits directly in front of the telephone mouthpiece.

In accordance with the present invention, a coin controlled air conditioning and circulating unit C is placed on a side wall adjacent the telephone B and in a position of ready access to the user.

The air conditioning and circulating unit C in a preferred embodiment comprises a casing 10 surrounded around its lower portion by outwardly projecting heat absorbing fins 11 which may be secured thereto or formed integrally therewith. The casing 10 is provided with a coin receiving slot 12 and an operating handle 13 which extends through the face thereof. A vent tube 14, having a check valve 14a therein, extends from the interior of the casing 10 through a wall of the booth A and communicates with the atmosphere outside thereof to carry away the gases or liquid formed within the casing 10 by the change of the solid refrigerant to its liquid or gaseous form.

A drip pan 15 is placed directly beneath the casing 10 and is of sufficient size to receive and hold the condensed moisture which drops from the fins 11 of the casing 10 after the casing has been cooled and then is permitted to be warmed to room temperature. An electric fan 16 is operatively connected through a suitable electric switch with a source of electrical energy, and is arranged to operate when the casing 10 is cooled and the fins 11 are absorbing heat from the interior of the booth A. The fan 16 is actuated through a thermal switch 16a placed on the casing 10 and it may be stopped by a door switch 16b actuated through movement of the door of booth A.

The casing 10 may be cooled by any desired type of solid refrigerant. One such refrigerant is shown in the accompanying drawing and is in the form of rectangular blocks of solid carbon dioxide, commonly referred to as "dry ice." As shown in detail in Fig. 2, the upper portion of the

casing 10 is formed as a heat insulated storage container 20 having walls lined with heat insulating material 21 and is provided with a hopper shaped bottom 22 through which extends an opening 23 of sufficient size to permit blocks of refrigerant to pass therethrough. The door opening 23 is normally closed by the delivery cylinder 25 which is mounted for rotation on the shaft 26 and is provided with a channel 27 of sufficient size to receive a single block 24 of the solid refrigerant at each time that it occupies the position shown in Fig. 2 and to discharge the block therefrom through the opening 23 when rotated 180° from the position shown in the view. The cylinder 25 may be formed of any desired heat insulating material such as synthetic resins, cork, or the like.

A pair of crushing rolls 28 and 29 rotating in a clockwise and counter clockwise direction about the shafts 30 and 31 respectively, are placed directly beneath the delivery opening 23 in the hopper bottom 22. The delivery cylinder 25 and the crushing rolls 28 and 29 are actuated by the handle 13 turning in a clockwise direction, when released by the coin release locking means designated generally at 40.

The coin release locking means 40 comprises a rotatable coin pocket 41 carried on a rotatable shaft 42 driven through bevelled gears 43 and 44 from the shaft 31 to which the operating handle is connected. A bracket 45 is secured to a side of the casing 10 and supports the coin released locking mechanism 40 and the shaft 42. When in the position shown in Fig. 3, the rotatable coin pocket 41 is maintained in such a position that the coin receiving slot 46 communicates with the end of the coin delivery tube 47 leading from the coin receiving slot 12. A spring pressed locking dog 48 having a depending lug 49 is maintained in intimate contact with the peripheral edge of the coin pocket 41 and abuts against a projecting lug 50 to lock the pocket 41 against rotation at all times when a coin has not been placed in the coin slot 46. When the coin is placed in the coin slot 46, the locking dog is raised against the tension spring 51 to such an extent that the coin pocket 41 may be rotated in a clockwise direction and the projecting lug 50 will clear the depending lug 49.

The coin released locking means 40 is operated, as before stated, from the shaft 31 to which the operating handle 13 is secured. Upon rotation of the handle 13 in a clockwise direction the shaft 31 is similarly rotated. This motion is transmitted through the bevelled gears 43 and 44 to the shaft 42. If a coin of suitable size is in the coin slot 46, the locking dog 48 will be raised and the coin released locking means will be released. When this occurs the continued movement of the shaft 31 is permitted and this motion is transmitted through the meshed gears 60 and 61 to operate the crushing rolls 28 and 29 and through the meshed train of gears 60, 62 and 63 to rotate the shaft 26 to which the delivery cylinder 25 is secured. As the shaft 31 continues to be rotated, the delivery cylinder 25 is rotated 180° from the position shown in Fig. 2 and the block of refrigerant 24 is discharged therefrom and passes through the opening 23 to the crushing rolls 28 and 29 which are rotating in opposite directions. The block 24 is caught between the teeth 28a and 29a on the rolls 28 and 29 and is crushed to small solid particles which drop to the bottom of the casing 10. By this means the solid refrigerant is rapidly transformed to its gaseous

or liquid form, as the case may be, and the change is effected much more rapidly than when the refrigerant is maintained as a solid block. This acceleration of the cooling of the casing 10 and the resultant absorption of the heat from the booth A through the fins 11 permits the use of the device with all forms of solid refrigerants to effect a rapid cooling of the container 10 or any enclosed space in which it may be placed. The device may be used with ordinary ice, as well as solidified carbon dioxide, and the water which is formed in the casing 10 may be drained out through the pipe 14, in which case the inlet thereof will be maintained at a proper point to carry away the water from the interior of the casing 10 and the pressure valve 14a may be dispensed with. If solidified carbon dioxide is used, carbon dioxide gas is formed and is carried away to the atmosphere through the vent pipe 14.

In the modified form shown in Fig. 4 the present invention is embodied in an insulated container 70 having an upper insulated storage portion terminating in a hopper bottom 71 having a delivery opening 71a therein. Directly beneath the opening 71a in the hopper bottom, crushing rolls 72 and 73 are provided. The crushing rolls 72 and 73 are rotatably connected with and operated by the operating handle 74. Blocks of solidified carbon dioxide or other suitable refrigerant pass through the opening 71a and are crushed by the rolls 72 and 73 and drop in the crushed form to the bottom of the compartment 75 through a rack 77 in which bottled goods or food stuffs 76 may be placed. By use of the crushing rolls 72 and 73 the solid refrigerant is reduced in size to such an extent that its transformation to the gaseous or liquid form and the accompanying withdrawal of heat from the compartment 75 and the articles contained therein is greatly facilitated. A vent 78 extends from the interior of the cabinet at a suitable position to convey away the formed gas or liquid.

In addition to the foregoing uses specifically mentioned in the description of the present embodiment of the invention many other uses will be apparent to those skilled in the art, such as cooling of other types of booths, refrigerated automatic vending machines or the like and I do not desire to be limited in my invention to any particularized use thereof.

I claim:

1. An air conditioning element for relatively small enclosed spaces and comprising a heat absorbing container, a heat insulated refrigerant storage magazine, a coin released delivery mechanism adapted to deliver a solid refrigerant from said storage magazine to said container, crushing members interposed between said delivery mechanism and said container and adapted to crush the solidified refrigerant prior to disposing it in the heat absorbing container.

2. An air conditioning element for relatively small enclosed spaces and comprising a heat absorbing container, a heat insulated refrigerant storage magazine, a coin released delivery mechanism adapted to deliver a solid refrigerant from said storage magazine to said container, crushing members interposed between said delivery mechanism and said container and adapted to crush the solidified refrigerant prior to disposing it in the heat absorbing container, said crushing members being connected with said coin released delivery means and adapted for simultaneous operation therewith.

3. A refrigerator cabinet comprising a cham-

ber for storing blocks of a solidified refrigerant, a pair of crushing rolls actuated by a handle secured thereto and adapted to reduce the size of the blocks of solidified refrigerant upon their passage from said chamber, and an enclosed refrigerating chamber adapted to receive the crushed particles of the refrigerant, and a vent communicating with the interior of the refrigerating chamber to carry away the refrigerant when changed to its gaseous or liquid form.

4. An air conditioning element for relatively small enclosed spaces and comprising a heat absorbing container having finned heat transferring members secured to the surface thereof, a heat insulated refrigerant storage magazine, delivery mechanism for delivering a solid refrigerant from said storage magazine to said container, crushing members interposed between such delivery mechanism and said container and adapted to crush the solidified refrigerant prior to disposing it in the heat absorbing container.

5. An air conditioning element for relatively small enclosed spaces and comprising a heat absorbing container, a heat insulated refrigerant storage magazine, delivery mechanism for delivering a solid refrigerant from said storage magazine to said container, crushing members

interposed between said delivery mechanism and said container and adapted to crush the solidified refrigerant prior to disposing it in the heat absorbing container, an electrically operated fan for circulating the air over and in contact with the surface of said heat absorbing container, and a thermal switch electrically connected with said fan and adapted to control its operation in accordance with the temperature of said container.

6. An air conditioning element for relatively small enclosed spaces comprising a heat absorbing container having finned heat transferring members secured to the surface thereof, a heat insulated refrigerant storage magazine, delivery mechanism for delivering a solid refrigerant from said storage magazine to said container, crushing members interposed between said delivery mechanism and said container and adapted to crush the solidified refrigerant prior to disposing it in the heat absorbing container, an electrically actuated fan for circulating the air over and in contact with the surface of said heat absorbing container, and a control system for said fan adapted to control actuation of said fan in accordance with the temperature of said container.

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