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COLD STORAGE CONTAINER

Filed Sept. 16, 1964

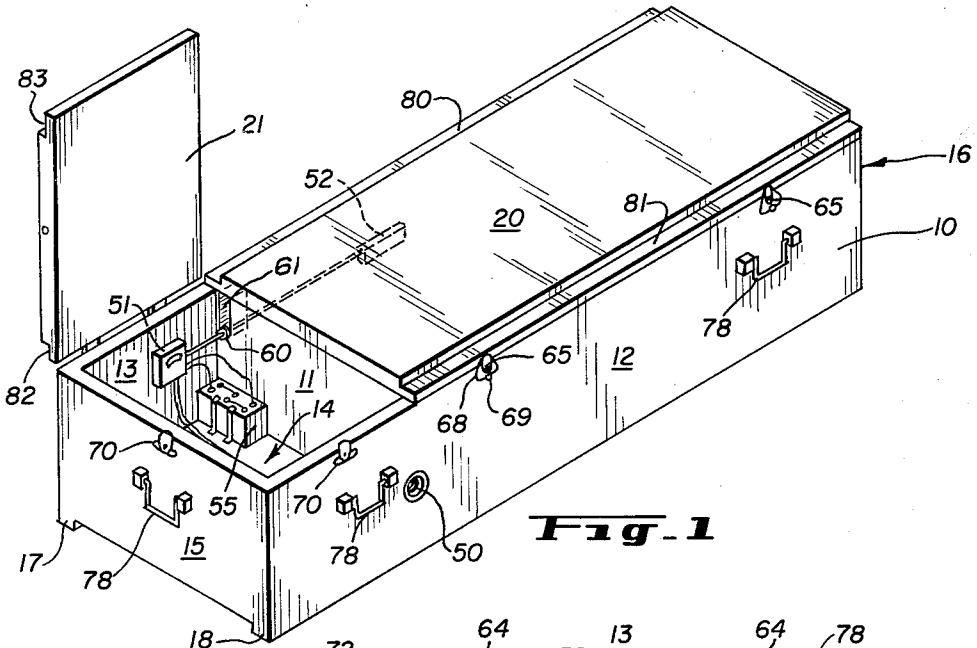

Fig_1

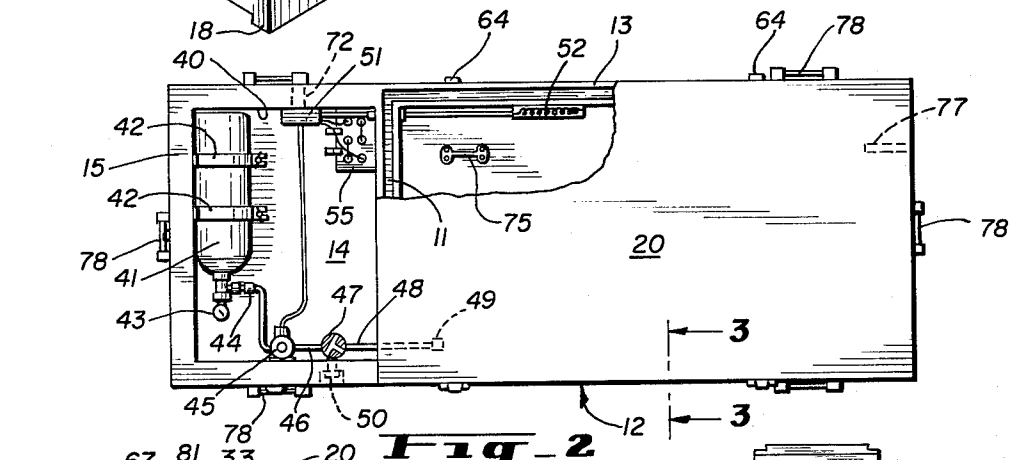

Fig_2

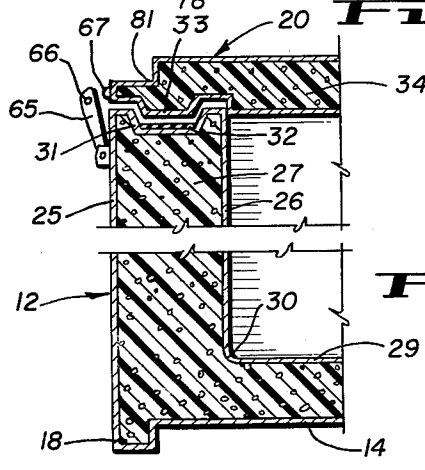

Fig_3

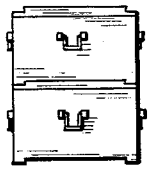

Fig_4

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COLD STORAGE CONTAINER

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This invention relates to storage containers and more particularly to insulated shipping and storage containers for frozen cadavers and the like.

Current practices in handling human dead include embalming for preserving the organic matter of the body for at least a period prior to interment. In most instances it also involves cosmetology to make facial features appear lifelike for viewing at the funeral. A trend away from the practice of displaying the deceased has been noted with increasing frequency. In addition, burials are most generally accomplished promptly without any extended holding of the body.

It has been established that embalming is not necessary for proper management of cadavers, but it is merely one method to keep the body from decomposing preparatory to and during the storage from death to the actual burial. Freezing the body of the deceased adequately arrests decomposition and/or prevents further decomposition so long as the body remains frozen. The conventional practice of embalming with embalming fluids fails to achieve its intended purpose when the body is badly decomposed. In addition, there is considerable discomfort for the handlers of such decomposed bodies.

According to the present invention we have provided a container for housing the remains of a person in frozen condition for storage as well as for shipping. The container is also arranged for the attachment of an external source of gas under compression for quick freezing the body in the container, and the container itself includes a self-contained supply of a high pressure gas which is arranged to maintain the body frozen for an extended period of time. The device provides, in effect, a two-compartment container, one for the body and one for the gas supply and control mechanism for maintaining a low temperature in the other compartment. The container is an efficiently insulated container arranged to provide a minimum of heat inleak so that it is a self-contained cold storage container capable of automatically maintaining its contents frozen for an extended period of time.

It is among the objects and advantages of the invention to provide a self-contained cold storage container arranged for automatic maintenance of the cold storage section of the container for substantial periods of time. The device provides a highly insulated cold storage container which is lightweight and arranged for easy cleaning for subsequent use. The invention includes a two-compartment container, one of which is a cold storage section and the other a supply and control section, the entire control mechanism of which may be readily removed and replaced in a matter of minutes. The container provides a self-contained cold storage maintenance mechanism for a substantial period of time and, in addition, provides for means for an initial quick freezing of the contents prior to the operation of the self-contained automatic mechanism.

These and other objects and advantages of the invention may be readily ascertained by referring to the following description and appended illustrations in which:

FIG. 1 is a perspective of a storage container according to the invention;

FIG. 2 is a top plan view, partly broken away, of the device of the invention showing the container and operating mechanism of the cold storage container;

FIG. 3 is a cross-sectional view in detail of a portion

of the container showing the construction thereof, including an insulated cover for the device; and

FIG. 4 is a small scale, end elevational view of several stacked containers of the invention.

In the device selected for illustration in FIG. 1, the invention includes a box-like receptacle **10** which is divided into two compartments by means of an internal wall **11**. The size of the container and of the individual compartments is determined by the size of the body to be contained. Usually it is made for children or adults. The container includes side walls **12** and **13** arranged in opposed parallel relation perpendicular to a base or lower wall **14**. End walls **15** and **16** close the outside ends of the container. The bottom wall **14** is provided with longitudinal lugs **17** and **18** arranged on each side thereof and extending below the bottom wall **14**, for stacking purposes as will be explained below. The internal wall **11** divides the container into two different sized compartments. The larger compartment is closable by a cover **20** and the smaller by a cover **21**, both of which are arranged for removably fitting over and enclosing its respective compartment.

In one form of the invention the side walls and bottom are made of spaced apart glass fiber resin impregnated outer and inner coverings. This makes a strong, durable lightweight container. When the space between the walls is filled with a foamed resin insulating material, the walls are of high heat resistance. Foamed plastics or resins or other lightweight materials of high heat barrier capacity may be used for insulation between the glass fiber walls. Such insulating materials may be of the expanded elastomer, thermoplastic or thermal setting type synthetic plastics. Common materials which may be expanded or foamed include phenolaldehydes, urea aldehyde resins, polystyrenes, polyalkyls, polyurethanes, polyvinyls and the like. It is important, however, that the insulating material have a low thermal conductivity for providing good insulation qualities in the container as well as being lightweight.

The details of FIG. 3 show the construction of a wall of the container which includes a wall **25** of glass fiber impregnated with a resin and a similar inner wall **26** spaced therefrom. The space therebetween is filled with an expanded plastic material **27**; preferably the filling is bonded to the walls for additional strength. The thickness of the glass fiber material and the expanded plastic is determined by the size and shape of the structure as well as the desired thermal conductivity requirements. The glass fiber material provides high resistance to damage as well as adding to the thermal conductivity.

The lower end of wall **25** terminates in a lower extending flange **18** which is preferably integral with the bottom **14**. The inner bottom **29** is preferably integral with the side wall **26** by a rounded corner **30** for ease of cleaning the interior portions of the container. As is common practice with glass fiber construction, all of the walls may be bonded together to form a continuous sheath around the insulation of the container.

The top of the wall **12** is provided with a groove **31** in which is mounted a gasket **32** which may be a flat soft resilient material for sealing a flange **33** on the top **20**. The top **20** is, in a similar manner, formed of glass fiber impregnated with resin sheet material which extends completely around a filling **34** of expanded plastic or similar insulating material. The flange **33** is molded to conform with the groove **31** to provide a firm seal for the interior of the storage container. The groove also should extend around the side walls, end wall and the internal partition wall of the container so as to completely seal the large container which will contain the frozen body.

The mechanism for automatically maintaining the large container at a sufficiently low temperature is preferably

mounted in an open top metal or other removable container **40** which just fits in the small compartment between the inner wall **11** and the end wall **15**. This provides means for removing or replacing the entire control and gas storage mechanism in a minimum of time. All of the mechanisms may, of course, be stored in the container without the removable modular unit construction, as explained above. The control mechanism includes a gas storage bottle **41** for liquid carbonic gas, liquid nitrogen or other highly compressed gas which on expansion provides cooling. The container or tank **41** is releasably held in position by means of straps **42** which hold the container in the proper position on movement of the container. A pressure gauge **43** may be mounted on the tank fitting and a conduit **44** extends from such fitting to a solenoid valve **45**. The solenoid valve has its outlet **46** connected to a three-way valve **47**, and from the three-way valve a line **48** terminates in a nozzle **49** for exhausting gas from the tank into the cold storage space. An inlet connector **50** is also connected to the three-way valve. The three-way valve **47** provides means for attaching an external tank (not shown) through a connector **50**, thereby bypassing the solenoid **45** and exhausting the expanding gas from such an exterior tank through the nozzle **49** into the interior of the container. This provides cooling and freezing without using the self-contained supply intake **41**.

For automatic control, the solenoid valve is controlled by a controller **51** which is interconnected with a temperature sensor **52**. A battery **55** is interconnected with the controller **51** providing actuating power for the valve **45** in response to the temperature sensor **52**. In this way the solenoid is controlled by the sensor in response to temperature changes in the container. For ease of replacing the control unit which normally has the sensor attached, an opening **60** through the inner wall **11** may be arranged with a removable block **61**. The block is readily removed when the cover **20** is open and the sensor may be lifted out with the control unit. A similar arrangement may be provided for the nozzle line **48** where it passes through the wall **11**.

The cover **20** is preferably hinged at one side, as for example hinges **64**, and latch members **65** on the opposite side provide means for securing the cover in position. Latches, shown in detail in FIG. 3, may be provided with an opening **66** on the movable latch portion arranged to mate with an opening **67** on the cover latch portion. A sealing wire **68** or similar seal may be passed through holes and a lead seal **69** placed thereon to indicate whether or not it has been tampered with and opened. The control mechanism compartment should likewise have its cover **21** provided with similar hinges and latch mechanisms **70**. However, the control mechanism should be accessible for checking or recharging the tank **41** or replacement of parts in the event malfunction occurs. These latches may, also, be provided with sealing means so that pilfering of the box will be readily noticed. For purposes of ascertaining the temperature of the storage section, an opening **72** may be provided in one wall adjacent the meter **51** so that a thermometer may be read directly through the wall without opening the top.

A series of strap loops **75**, only one of which is shown in FIG. 2, may be arranged around the bottom of the cold storage compartment for strapping the contents in a generally immovable condition. In addition, since the container is cooled by means of expanding gas, some means must be provided for release of the gas and preferably maintain a slight pressure internally thereof to prevent ingress of hot air. For this purpose any convenient check valve **77** may be provided through a side or at one end to release excess internal pressure. For carrying the container it is provided with handles **78** which are conventional for the particular type of equipment. Also, the box may be made in various sizes to conform with the size of the cadaver to be contained. For convenience a removal tray may be used in the storage compartment with a load secured to the tray and the tray variously removably secured in the compartment.

The longitudinal flanges **17** and **18** are arranged to seat in corresponding grooves in the top of another container for secure stacking. The grooves **80** and **81** in the lid **20** mate with grooves **82** and **83**, respectively, in the small cover **21**. This provides a track for the bottom flanges of a superimposed container for stacking, as shown in FIG. 4. These flanges provide security in stacking, and thus reduce space requirements.

While the invention has been illustrated with reference to a particular embodiment, there is no intent to limit the spirit or the scope of the invention to the precise details set forth, except as defined in the following claims.

We claim:

1. A cold storage container of the class described comprising an elongated container having an open top and having insulated side and bottom walls; an insulated intermediate wall dividing said container into two compartments, one of which is a cold storage compartment and the other is an ambient temperature compartment; an insulated cover releasably closing said cold storage compartment; a cover independently closing said ambient temperature compartment; a a container for gas under pressure mounted in said ambient temperature compartment; a conduit line extending from said container to said cold storage compartment; a nozzle mounted on the end of said conduit extending into said cold storage compartment; a solenoid valve mounted in said conduit for controlling the passage of gas therethrough; temperature sensor means mounted in said cold storage compartment; means interconnected with and responsive to said temperature sensor means for controlling said solenoid; and means for releasing excess gas under pressure from said cold storage compartment.

2. A cold storage container according to claim **1** wherein said container is of glass fiber sheathing over an insulating material.

3. A cold storage container according to claim **1** wherein said container includes flanges extending from said bottom and said top includes side grooves positioned to mate with the flanges of a superimposed similar container.

4. A cold storage container of the class described comprising an elongated container having an open top and having insulated side and bottom walls; an insulated intermediate wall dividing said container into two compartments, one of which is a cold storage compartment and the other is an ambient temperature compartment; a cover releasably closing said cold storage compartment; a cover independently closing said ambient temperature compartment; a removable insert in said ambient temperature compartment; a container for gas under pressure mounted in said insert; a conduit line extending from said container to said cold storage compartment; a nozzle mounted on the end of said conduit extending into said cold storage compartment; a solenoid valve mounted in said conduit for controlling the passage of gas therethrough; temperature sensor means mounted in said cold storage compartment; means interconnected with and responsive to said temperature sensod means for controlling said solenoid; means for releasing gas from said cold storage compartment; and means for removing said nozzle and said sensor with said insert.

5. A cold storage container of the class described comprising an elongated container having an open top and having insulated side and bottom walls; an insulated intermediate wall dividing said container into two compartments, one of which is a cold storage compartment and the other is an ambient temperature compartment; a cover releasably closing said cold storage compartment; a separate cover closing said ambient temperature compartment; a container for gas under pressure mounted in said ambient temperature compartment; a conduit line ex-

tending from said container to said cold storage compartment; gas discharge means mounted on the end of said conduit in said cold storage container; a solenoid valve mounted in said conduit for controlling the passage of gas therethrough; temperature sensor means mounted in said cold storage compartment; means interconnected with and responsive to said temperature sensor means for controlling said solenoid; a three-way valve in said conduit bypassing said solenoid; an external gas supply connector communicating with said three-way valve for injecting gas into said cold storage compartment; and means for releasing gas from said cold storage compartment.

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MEYER PERLIN, *Primary Examiner.*