

[54] **PERSONAL INSULIN COOLER**

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 [58] Field of Search 62/3

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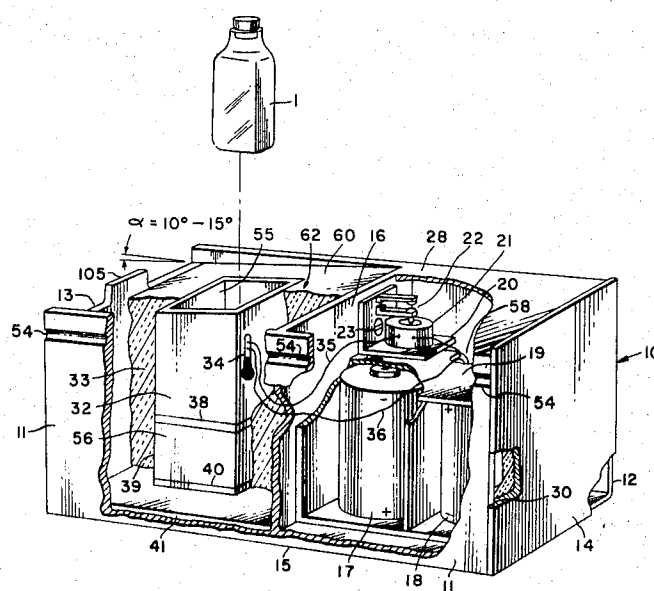
[57] **ABSTRACT**

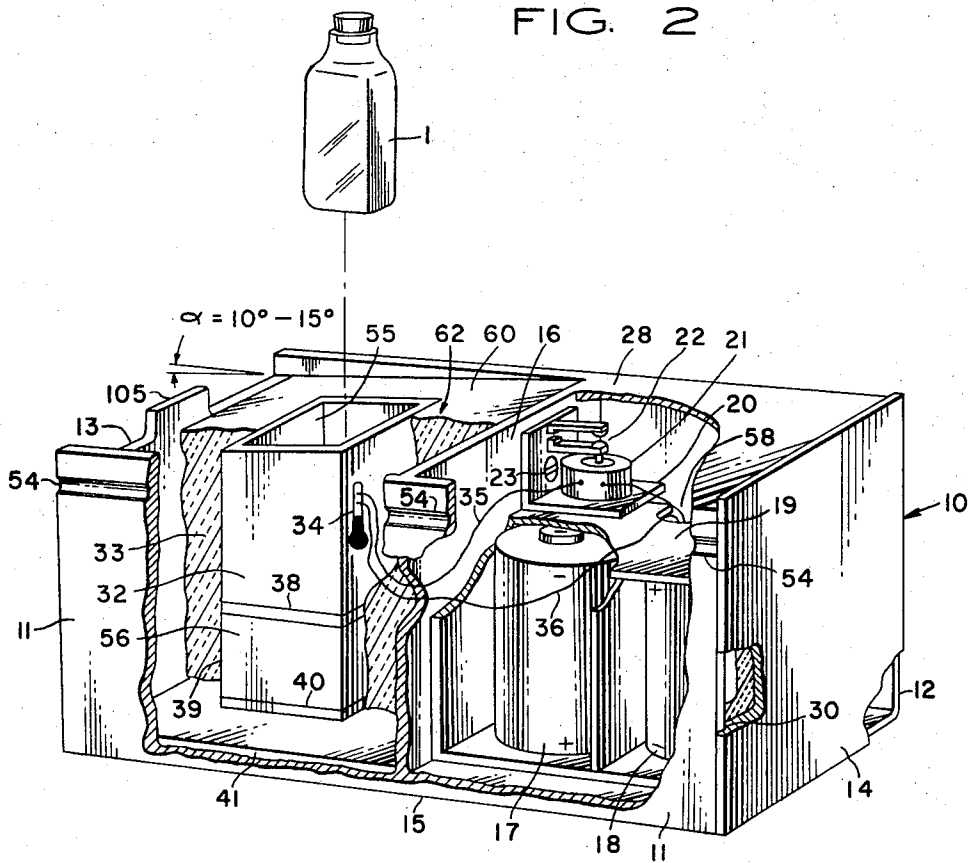
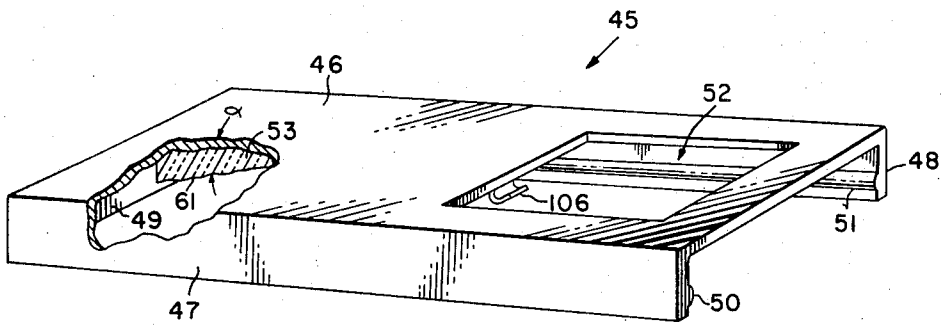
A first container of a size to be carried on a person's body or in a small case of high thermal conductivity material is partitioned into first and second compart-

ments with a battery source positioned in the first compartment, and the assembly of a second container, also of high thermal conductivity, mounted upon the cold surface of a thermo-electric unit, positioned in said second compartment. The second container is of a shape and size to receive a vial of insulin with the vial being in thermal contact with the high thermal conductivity walls of the second container. The hot surface of the thermo-electric unit is mounted upon the bottom of the first container to provide a heat transfer path from the second container, through the thermo-electric unit and then to said first container, which functions to dissipate the heat into the ambient environment. Insulating means is firmly packed between the inside walls of said second compartment and the assembly consisting of said second container and said thermoelectric unit. A temperature sensitive switch responds to the temperature of said second container, whenever said temperature exceeds a predetermined threshold, to connect said battery source across said thermo-electric unit to initiate cooling of said second container for maintaining the insulin refrigerated.

This invention relates generally to portable refrigerators and, more particularly, to very small, self contained, portable refrigerators which have a high thermal efficiency which can be carried on a person's body or in a small case.

5 Claims, 6 Drawing Figures





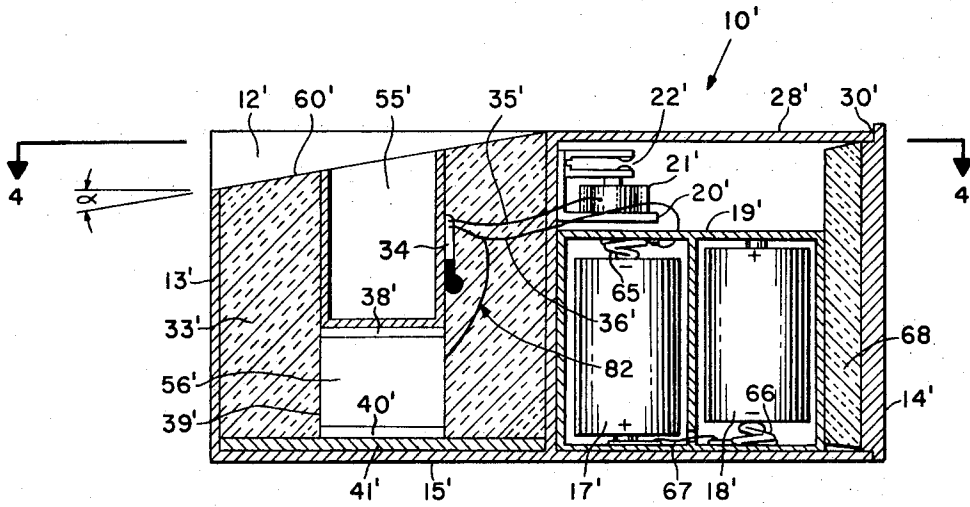


FIG. 3

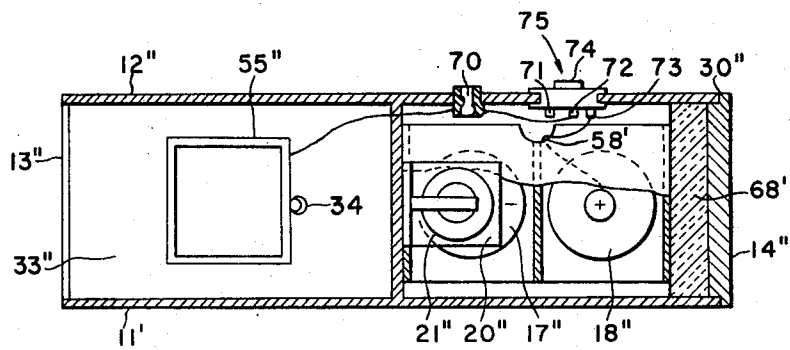


FIG. 4

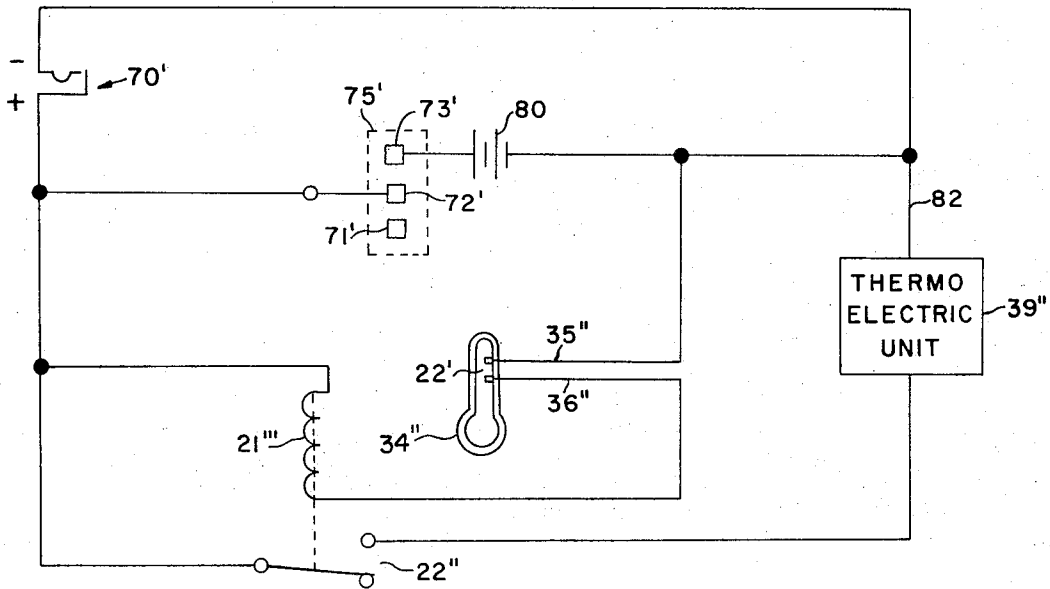


FIG. 5

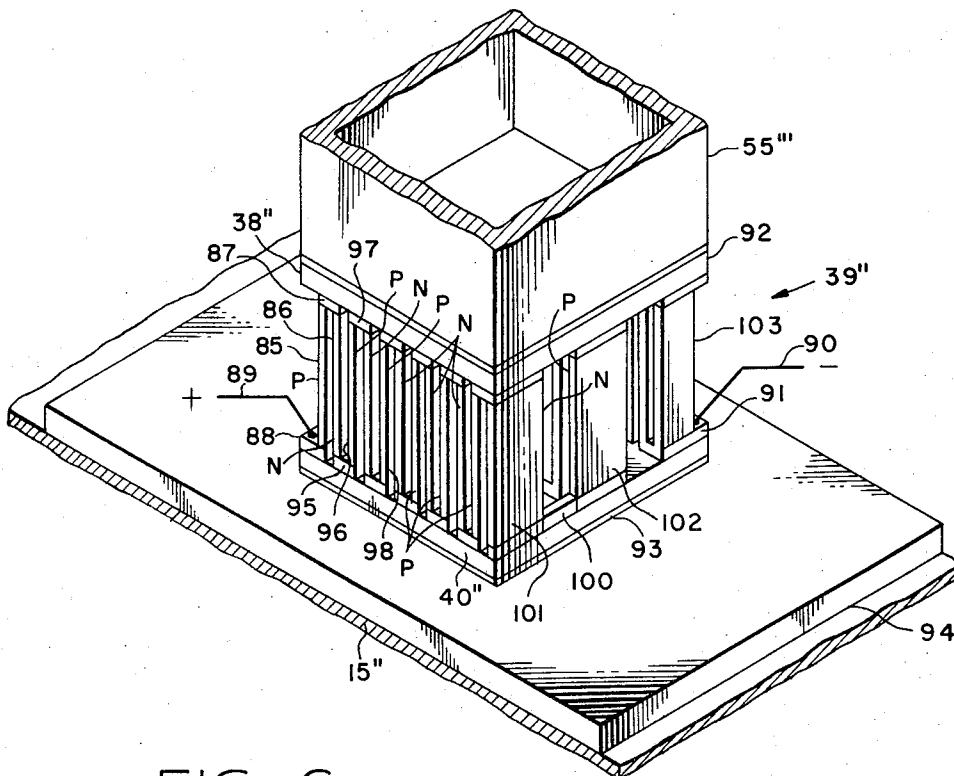


FIG. 6

PERSONAL INSULIN COOLER

INTRODUCTION

The need for insulin by diabetic people has created a need for a smaller cooler for storing insulin which can be carried by the diabetic. Approximately 1 per cent of the population of the United States are diabetics. Of this 1 per cent, about one-third require daily intravenous injections of insulin. For example, a typical diabetic requiring intravenous insulin might need an injection in the morning before going to work and then a second injection in the late afternoon, perhaps immediately after work. Since insulin changes its chemical composition if the temperature thereof is allowed to rise above about 41° F. for periods of an hour or longer, it is necessary to keep the insulin in a refrigerated condition at a temperature below 41° F. Consequently, the average diabetic must keep his insulin at home in the family refrigerator, since very few people have access to refrigerators at their places of employment. Since the diabetic's life must necessarily center around the life-sustaining insulin shots, he must each day return immediately to his home after work for his afternoon injection.

Should he go on a vacation or take a business trip, the diabetic must carefully make arrangements in advance of his trip to ensure that proper refrigerating means are available to him at all times. Even with the best of planning, however, certain problems arise. For example, it is difficult to arrange for proper refrigerating means during traveling, or at motels and hotels, or at relatively remote places such as hunting and fishing cabins.

One means by which the foregoing problem has been met in the past has been through the use of insulated containers packed with either conventional or dry ice. Such arrangements, however, have proven to be somewhat unsatisfactory because of the marked lack of temperature control as well as the relatively short life of either dry ice or conventional ice, and, particularly, with conventional ice. Furthermore, such means for refrigerating insulin is quite bulky and quite unsuited for traveling purposes, other than by car.

Accordingly, it is the primary object of the present invention to provide a compact, battery operated, portable refrigerating means capable of properly refrigerating insulin over several days without the necessity of recharging the batteries.

A second purpose of the invention is a A-C or D-C battery operated, portable refrigerating means capable of properly refrigerating insulin over a period of several days, and sufficiently compact to be carried on a person's body or in a small case.

A third aim of the invention is a small, compact refrigerating means which is operable either from a conventional 110 volt A-C power source or a self contained battery source, the latter being operable continuously for several days without recharging.

A fourth object of the invention is a small, battery operated, compact portable refrigerating means for keeping insulin refrigerated.

STATEMENT OF INVENTION

In accordance with the invention, there is provided a first container whose sides, ends, top and bottom are generally rectangular in shape. A partition extends

from the bottom to the top, and functions to divide the container into two sections. The first section contains the battery source and a relay means. The second section contains a second container which forms the refrigerated chamber and, also, contains insulating means positioned between the outside of said second container and the inner wall of the said second section. A thermo-electric unit has a first thermally conductive surface and a second thermally conductive surface and is constructed to respond to an electric current to cause heat energy to transfer from said first surface to said second surface, thereby causing said first surface to become cool. The said first surface is thermally connected to said second container and the said hot surface is thermally connected to the bottom of said first container, thereby providing a heat exchange system with the heat from said second container being transferred through said thermo-electric means to the bottom of said first container, which functions to dissipate the heat energy to the surrounding environment, usually the atmosphere.

A heat responsive switch positioned in close proximity to said second container means is connected in series arrangement with the winding of said relay means and said battery source, and further is constructed to respond to a predetermined maximum temperature of said second container means to become closed to thereby energize said relay winding. A pair of normally open contacts respond to the energization of said relay winding means to connect said battery source across said thermo-electric element to initiate the heat transfer process and thereby cool the said second containing means.

In accordance with a feature of the invention the said first container is construed of a material having a high coefficient of thermal conductivity, such as aluminum, to thereby provide a large surface area from which heat can be dissipated to the ambient environment.

In accordance with a second feature of the invention, the top of said first container is open over the said second section thereof. A slidable cover, provided to fit over the top of said container, has an opening positioned over the said first section of said first container when the cover is in its normal closed position. Appropriate means, such as a groove and tongue arrangement, are provided whereby the cover can be slid along the top of said first container in a direction such that the opening in said cover coincides substantially with the opening in the top of said first container, and thereby permitting the user to have access into said second container means.

In accordance with still another feature of the invention, the top surface of said insulating material in said first container is substantially planar in nature and inclined at an angle with respect to the top of said first container. A second insulating means is secured on the underside of the cover and on the portion thereof immediately above the second section of the first container. This second insulating means is configured to have its surface also substantially planar in nature and inclined at an angle with respect to the top of said first container such that it will mate with the top of the first insulating material when the cover is fully closed. When said cover is moved to its open position the said planar surfaces of the two insulating means will withdraw from each other in a non-binding manner.

DRAWINGS

The above mentioned and other objects and features of the invention will be more fully understood from the following detailed description thereof when read in conjunction with the drawings in which:

FIG. 1 is a perspective view of the invention with part of the outer container and part of the insulation broken away to show the internal structure thereof;

FIG. 2 is a perspective view of the sliding cover of the invention with a portion thereof broken away to show the insulation secured to the underside thereof;

FIG. 3 is a plan view of the side of the invention with the side of the container removed;

FIG. 4 is a top view of the invention without the sliding cover, and with a portion of the top of the container broken away;

FIG. 5 is a schematic diagram of the control circuit of the invention; and

FIG. 6 is a perspective view of the thermo-electric unit employed to effect the heat transfer from the refrigerated second compartment to the outer container of the device.

Referring now to FIG. 1, much of the outer container 10 is broken away to show the inner elements of the device. Such outer container 10 consists of two sides 11 and 12, two ends 13 and 14, a top 28 and a bottom 15. The bottom 15 and the two sides 11 and 12 should be of a material having a high coefficient of thermal conductivity, such as aluminum for example. The two ends 13 and 14 can be of aluminum, or they can be of some other material such as plastic, since they are too far removed from the heat source (hot plate 41) to dissipate a significant amount of heat energy. The outer container is sufficiently small that it can be carried on a person's body or in a small case.

While the end 13 can be permanently secured to the sides 11 and 12 of the container, the other end 14 must be removable in order for the user to have access to the batteries 17 and 18 contained in bracket 19. The entire assembly, including bracket 19 and the two batteries 17 and 18, are removable from the container simply by removing the snap-on end 14.

From FIG. 1, it can be seen that the end 14 has an inner raised portion 30 which is constructed to make a friction contact fit with the insides of walls 11 and 12, the top 28 and the bottom 15 when said end 14 is pressed into place in the container. A better view of the raised portion 30 is shown in FIG. 3, wherein said raised portion is identified by reference character 30', and the end plate by 14'.

A partition 16 functions to divide the main container 10 into two sections. One of these sections contains the batteries 17 and 18, and also contains a relay bracket 20 supported on the partition 16 by suitable means such as screw 23. Mounted on said relay bracket 20 is a relay winding 21 and a pair of contacts 22, which contacts function generally to connect the batteries 17 and 18 across the thermo-electric unit 39 when the temperature of container 55 rises above a predetermined value. A more detailed description of the relation between the electrical control circuit and thermo-electric unit 39 will be set forth later herein. On the left hand side of the partition 16, there is shown a second container 55 which is mounted upon the thermo-electric unit 39, which in turn is mounted upon a plate 41. The said plate 41, of large thermal conductivity, rests

upon the bottom 15 of the main container 10. The container 55 is configured to receive a vial 1 of insulin with the walls of the vial in close proximity to the walls of container 55 and the bottom of the vial resting on the bottom of container 55 mounted on plate 41.

The thermo-electric unit 39 is comprised of three portions; a central portion 56 comprised of a plurality of bi-metallic elements wherein the heat energy imbalance is originated, a cold accumulating plate 38 and a heat accumulating plate 40. The cold plate 38 is located at those junctions of the bi-metallic elements at which heat is removed and the temperature accordingly lowered. The hot plate 40 is located at those junctions of the bi-metallic elements where heat is generated and the temperature accordingly increased. It is to be noted that both the plates 38 and 40 are closely mated to the bottom of the refrigerated container 55 and to the plate 41 respectively, so that the thermal conductivity between said plates 38 and 40 and the surfaces to which they are connected, is very high. A more detailed discussion of such connections will be set forth later herein in the discussion of FIG. 6.

A temperature sensitive switch 34 is affixed to the outer side of the container 55 in such a manner as to establish good thermal conductivity between switch 34 and the container 55. While the switch 34 can be any one of several types of temperature sensitive detecting switches, the particular one shown in FIG. 1 is essentially a thermometer with two contacts positioned within the capillary tube. Thus, when the mercury rises in the tube in response to a temperature increase, the contacts will be closed through the mercury column.

The entire assembly, including the container 55, the thermo-electric unit 39, the switch 34, and the bottom plate 41 are encapsulated or enclosed within a suitable insulating material 33, which can be, for example, Polystyrene insulating material, or Polyurethane insulating material. Not only does such insulating material perform the essential insulating function, but it also serves to support both the container 55 and the thermo-electric unit 39 in their proper positions. It should perhaps be specifically noted that the insulating material completely fills the space between the outside surfaces of the walls of the container 55 and the thermo-electric unit 39, and the inside walls of the second section of the main container 10, i.e. the section to the left of the partition 16 in FIG. 1.

In FIG. 1, several wires are shown extending between various points within the container 10. These wires are shown simply to give an idea of how such leads are passed through the insulation and the partition 16. It is to be noted that all of the wires of the control system are not shown in FIG. 1, only a few. One specific pair of wires shown in FIG. 1 are the leads 35 and 36 which extend from the contacts within the temperature sensitive switch 34. One of these wires goes to a terminal relay winding 21 and the other lead 36 goes to a terminal of the battery source through an aperture 58 provided therefor in bracket 19.

A groove, such as groove 34, is formed near the top of the outside of each of the side plates 11 and 12. Such grooves are parallel to the top edge of the side plates and function to receive mating tongues 50 and 51 provided in cover 45 as shown in FIG. 2. Through the use of this tongue and groove arrangement, the cover 45 of

FIG. 2 is caused to be slidable back and forth across the top of the container 10.

When the cover 45 is closed, the right hand end thereof abuts against the extended end portion 31 of end plate 14, and the aperture 52 formed in the cover 45 is positioned over the enclosed portion of the top 28 of main container 10.

More specifically, when the cover 45 is closed, the aperture 52 therein will be over that portion of the container 10 containing batteries 17 and 18, and the closed portion of cover 45 will be over the open portion of the container 10, i.e. over that portion containing the insulative material 33 and the container 55. In such closed position of cover 45, the surface 61 of the wedge shaped piece of insulating material 53, affixed to the inner side of cover 45, will mate with the inclined surface 60 of the insulative material 33 of FIG. 1. It is to be noted that both the surface 61 and 60 are inclined at an angle with respect to the plane of the top of the container 10.

When the cover 45 is slid to the left in its tongue and groove arrangement, the surface 61 of insulative material 63 in the cover 45 will move away from the surface 60 of the insulative material 33 in FIG. 1 in a non-binding manner. The cover 45 is slid to the left until the aperture 52 in the cover is positioned over the aperture 62 in the top 28 of container 10 so that the user has easy access to the refrigerated container 55 wherein the insulin is kept. A suitable mechanical limit switch, comprised of spring 106 in FIG. 2 and stop 105 in FIG. 1, restrains the cover 45 from sliding completely off the main container 10.

To close the container the cover 45 is moved to the right in FIG. 1 so that the surface 61 of insulative material 53 (FIG. 2) mates with the surface 60 of insulative material 33 in the main container 10 to seal the refrigerated chamber 55. Because of the inclined angle α of surface 61 and 62, a wedging action is obtained when the cover 45 is closed whereby the tongues 50 and 51 are forced upwards in the grooves, such as groove 34, to provide a snug friction fit which will prevent the cover from becoming opened easily. To open said cover 45 requires the user to firmly grip the cover and slide it back.

Referring now to FIG. 3, there is shown a cross-sectional view of the invention in a plane passing vertically through the center of the structure of FIG. 1 and parallel to the two sides 11 and 12 thereof.

The diagram of FIG. 3 shows some of the features of the invention that are perhaps not shown with sufficient clarity in the perspective view of FIG. 1. For example, in FIG. 3 it can be seen clearly that the surface of the insulating material 33' lies in a plane inclined at an angle α with respect to the plane of the top portion 28' of the main container 10'. The batteries 17' and 18' can be seen to be connected in series arrangement in a circuit extending from the spring contact 65, which is part of the battery bracket 19', through battery 17' to the negative terminal thereof, the positive terminal of battery 17', and then through a connecting wire 67 to a second spring contact 68, which in turn is connected to the negative terminal of battery 18'. To provide a more secure packaging of the battery assembly, and also to increase the insulating properties of the entire structure, there is provided a thin strip of foam pad 68 which

can be cemented to the end plate 14'. This foam pad 68 presses against the end of the battery bracket 19', holding it securely in place.

The remaining elements of FIG. 3 having corresponding elements in FIG. 1, are identified by similar reference characters, although primed.

Referring now to FIG. 4 there is shown a top view of the device of FIG. 1. These elements in FIG. 4 which correspond to similar elements in FIGS. 1 and 3 are identified by similar reference characters although primed or double primed.

In FIG. 4 a jack 70 and a slide switch 75 are shown for the first time. The jack and slide switch do not appear in FIGS. 1 and 3 because they are on the back of the case as represented in FIGS. 1 and 3.

The slide switch 75 is a single pole, double throw type switch having three contacts 71, 72 and 73. Generally speaking, the function of the slide switch 75 is to connect or disconnect the battery assembly into the circuit. The specific function of slide switch 75 will become more apparent from the discussion of the electrical control circuit of FIG. 5.

The function of jack 70 is to receive an external D-C voltage presumably from an A-C to D-C converter, for the purpose of recharging batteries 17' and 18'.

Referring now to the electrical circuit of FIG. 5, the batteries 17 and 18 are represented by the single D-C battery supply 80, with the negative terminal thereof being connected to the thermo-electrical unit 39'' through a lead 82, and also being connected through the lead 35'' to one of the contacts in the temperature sensitive switch 34''. The other contact of said switch 34'' is connected through lead 36' to one terminal of relay winding 21'''. The other terminal of said relay winding 21''' is connected back to the positive terminal of battery source 80 through slide switch 75' when the center contact 72' is connected to the contact 73'.

Under the forgoing conditions, the relay winding 21''' will be de-energized as long as the contacts of temperature sensitive switch 34''' are open. However, when the temperature increases above the critical temperature of about 41° F. the mercury column in said temperature switch 34''' will rise to close the contacts 22 thereof and thus connect battery source 80 across said relay winding 21'', and thereby energizing said relay winding 21''. It is assumed that the slide switch 75' is in its operating position, i.e. with the contact 72' connected with the contact 73'. Energization of relay winding 21''' closes the normally open contacts 22'' to connect the battery source 80 across the thermal unit 39'', thereby causing the cooling action to commence.

When the temperature of the cooling compartment, which is the container 55 of FIG. 1, falls below 41° F. the contacts 22'' in temperature switch 34''' become opened, thereby de-energizing relay winding 21''' and opening contacts 22''. Opening of contacts 22'' will remove battery source 80 from across the thermo-electric unit 39' to discontinue the refrigerating process.

The type batteries employed in the system can be the nickel cadmium batteries which will provide sufficient power to operate the system for several days without recharging. It should be noted that about one watt of power is needed to maintain the desired temperature within the cooling container 55 of FIG. 1 for the aforementioned several days.

However, the batteries must be recharged periodically. Such recharging is accomplished by inserting a plug in the jack 70' and supplying a D-C voltage across the battery source 80. It is to be noted that the system will function during the recharging of the battery source 80. Thus, it is possible to operate the system for extended periods of time from a conventional 110 volt A-C outlet in an office building or at home, while at the same time charging the battery source 80. When the batteries become charged to their proper level the charging process will discontinue, although the device can continue to be operated from the A-C source.

Referring now to FIG. 6, there is shown a more detailed perspective view of the thermo-electric cooling unit 39'' and its thermal connections with the cooling chamber 55''' and to the base 15'' of the main container.

The cooling effect is obtained by a plurality of bi-metallic strips such as strips 85 and 86 which extend between suitable connector pads, such as pads 87 and 88, formed on the cold and hot plates 38'' and 40'', respectively. Each pair of such bimetallic strips are connected in series arrangements with a following pair of bi-metallic strips. More specifically, the strips 85 and 86 are connected in series arrangement with the bi-metallic strips 96 and 98 via the connecting pad 95. At the end of the first row of bi-metallic strips there is provided a connecting pad 100 which connects the last bi-metallic strip 101 in the first row to the first bi-metallic strip 102 in the second row. By a similar connecting pad, not shown, in FIG 6, the last bi-metallic strip in the second row is connected to the first bi-metallic strip in the third row. Thus, the bi-metallic strip 103 is the last strip in the circuit and terminates on connecting pad 91 which is electrically connected to the negative terminal of the battery source. From the foregoing, it can be seen that the positive current source flows into input terminal 89 and then in series through each pair of bi-metallic strips, and finally back to the battery source.

It is to be noted that each pair of bi-metallic strips consists of a strip of P type semiconductor material and a strip of N type semiconductor material. It is a well known physical effect that when a current is caused to flow from through a P-N junction, a cooling effect occurs. Since, in the diagram of FIG. 6, the positive current flow is always through a P-N junction at the connecting pad on the cooling plate 38', a cooling effect always occurs. On the other hand, since the current flow through the pads formed on the hot plate 40' is always from an N type material to a P type material, a heating effect occurs at said hot plate 40'. Thus, the over-all effect of the thermo-electric unit 39'' is to transfer heat from the cold plate 38'' to the hot plate 40''.

The cold plate 38'' is formed of a material having a high coefficient of thermal conductivity. Such a characteristic is found in a product known as Beryllia, which is comprised of about 95 per cent beryllium oxide, with small percentages of beryllium nitrate and beryllium carbonate, all of which are placed in a polyvinyl alcohol to form a paste. The paste is then dried, formed in the proper shape, and then baked.

On this Beryllia material plate the connector pad, such as pad 87, is formed by suitable electro-plating or photographic means. The Beryllia plate is secured to the bottom of the cooling container 55''' by means of a

binding material having a very high coefficient of thermal conductivity. Such a binding material can be a silver filled epoxy.

Similarly, the heating plate 40'' is comprised of a Beryllia material which is secured to the aluminum plate 41'' by means of a silver filled epoxy. The bottom surface of the plate 40'' is finished to a high polish and coated with a layer of grease having a high coefficient of thermal conductivity. Because of the large surface area of the plate 41'', sufficient heat transfer from said plate 41'' to the bottom 15'' of the container is obtained.

The conductor pads such as pad 87 can be of a molybdenum manganese alloy which is electro-plated upon the Beryllia plate and subsequently nickel plated by immersion electrolysis.

The P type bi-metallic strips can be of an alloy of bismuth, antimony, tellurium, and selenium, with certain dopants included therein to supply the necessary P type characteristics. The N type strips such as strip 86 is comprised of bismuth, tellurium and selenium, with certain dopants, such as copper, silver chloride and silver bromide added to obtain the necessary N type characteristics.

It is to be understood that the form of the invention shown and described herein is but a preferred embodiment thereof, and that various changes in materials and substitution of elements, as well as changes in packaging, may be effected without departing from the spirit or scope of the invention.

What is claimed is:

1. A portable refrigerating means for cooling insulin comprising:
 - a main container including at least one wall portion of a thermally conductive material and of a size to be carried on a person's body or in a small case;
 - dividing means for dividing the interior of said main container into first and second sections;
 - a battery source positioned in said first section;
 - a thermo-electric cooling unit having a first surface which cools and a second surface which heats in response to an electric current passing therethrough;
 - means for thermally connecting said second surface to the inside surface of at least one wall portion of said main container which dissipates the heat energy supplied thereto from said second surface to the ambient environment of the portable refrigerating means;
 - a second container of a thermally conductive material and comprising sidewalls and a bottom configured to receive a vial of insulin;
 - said main container having the top portion thereof open over said second section of said main container and said second container;
 - said second container having its outside dimensions smaller than the inside dimensions of said second section and positioned within said second section with its bottom thermally secured to said cold surface of said thermo-electric cooling unit;
 - first insulating means packed between an assembly comprised of said thermo-electric unit and said second container and the inner surfaces of the walls of said second section;

the surface of said first insulating means being of planar configuration and inclined at an angle α with the plane of the top of said main container; an insulated cover constructed to fit over the top of said main container and to slide bi-directionally along the length of said top to alternately assume an open condition or a closed condition; said cover having an aperture formed therein which is positioned over said first section of said main container when said cover is in its closed condition and which is positioned over said second section of said main container when said cover is in its open condition; and

a control circuit comprising a temperature responsive switching means responsive to a predetermined maximum temperature of said second container to connect said battery source to said thermo-electric unit and energize said thermo-electric unit.

2. A refrigerating means in accordance with claim 1 in which the surface of said first insulating means has a planar configuration which is inclined at an angle α with the plane of the top of said main container; in which said insulated cover comprises;

second insulating means secured to the underside of said cover on that portion thereof which is positioned over said second section of said main container when said cover is in its closed condition;

said second insulating means having that surface thereof, which faces the surface of said first insulating means, inclined at an angle α with respect to the top of said main container to enable the surfaces of said first and second insulating means to mate when said cover is in its closed condition, thereby insulatively sealing said second container from the ambient environment.

3. A refrigerating means in accordance with claim 1 in which said control circuit comprises:

relay winding means connected in series arrangement with said battery source and said temperature responsive switching means, and constructed to become energized in response to closure of said temperature responsive switching means;

contact means constructed to respond to energization of said relay winding means to connect said battery source across said thermo-electric cooling unit; and

battery source charging means comprising electrical receptacle means secured to said first container and having first and second terminals connected respectively to the positive and negative terminals of said battery source.

4. Portable refrigerating means comprising:

a main container having two sides, two ends, a top and a bottom, with the length of the sides being greater than the height of said sides, and the height of said sides being greater than the width of said top;

partitioning means positioned within said main container and parallel to said ends thereof, to partition

said main container into first and second sections; a battery source positioned within said first section of said main container;

a thermo-electric unit having first and second electrical input terminals and first and second surfaces which become cold and hot, respectively, in response to a current of predetermined polarity being applied to said input terminals;

means for thermally connecting said second surface of said thermo-electric unit near the center of the bottom of said second section of said main container;

a second container constructed to be less than one half the volumetric size of said second section and having sidewall elements and a bottom, with said bottom being mounted upon, and thermally connected to the said cold surface of said thermo-electric unit, and further with the said sidewall elements extending upwardly within said second section and normal to the bottom of the main container; and

first insulating means positioned between the inner walls of said second section and the assembly comprised of said second container and said thermo-electric unit;

said top of said main container being open over said second section of said main container;

the surface of said first insulating means being of a planar configuration which is inclined at an angle α with the plane of the top of said main container; and

an insulated cover constructed to fit over the top of said main container and to slide bi-directionally along the length of said top to alternately assume an open condition or a closed condition;

said cover having an aperture formed therein which is positioned over said first section of said main container when said cover is in its closed condition and which is positioned over said second section of said main container when said cover is in its open condition.

5. A refrigerating means in accordance with claim 4 in which the surface of said first insulating means has a planar configuration which is inclined at an angle α with the plane of the top of said main container; and in which said insulated cover comprises:

second insulating means secured to the underside of said cover on that portion thereof which is positioned over said second section of said main container when said cover is in its closed condition;

said second insulating means having that surface thereof, which faces the surface of said first insulating means, inclined at an angle α with respect to the top of said main container to enable the surfaces of said first and second insulating means to mate when said cover is in its closed condition, thereby insulatively sealing said second container from the ambient environment.

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