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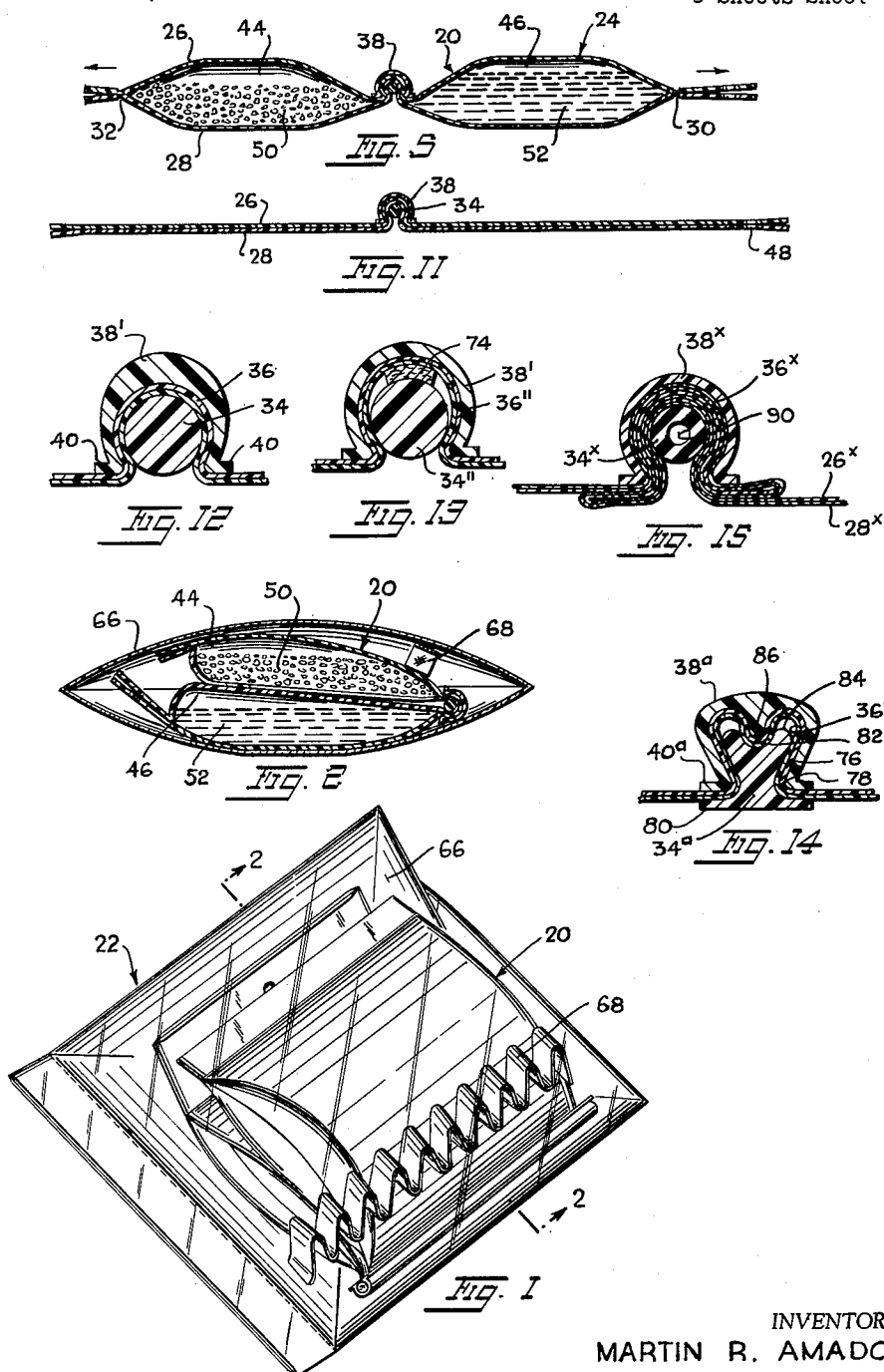
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3,149,943

CHEMICAL REFRIGERANT PACKAGE

Filed Nov. 20, 1961

3 Sheets-Sheet 1



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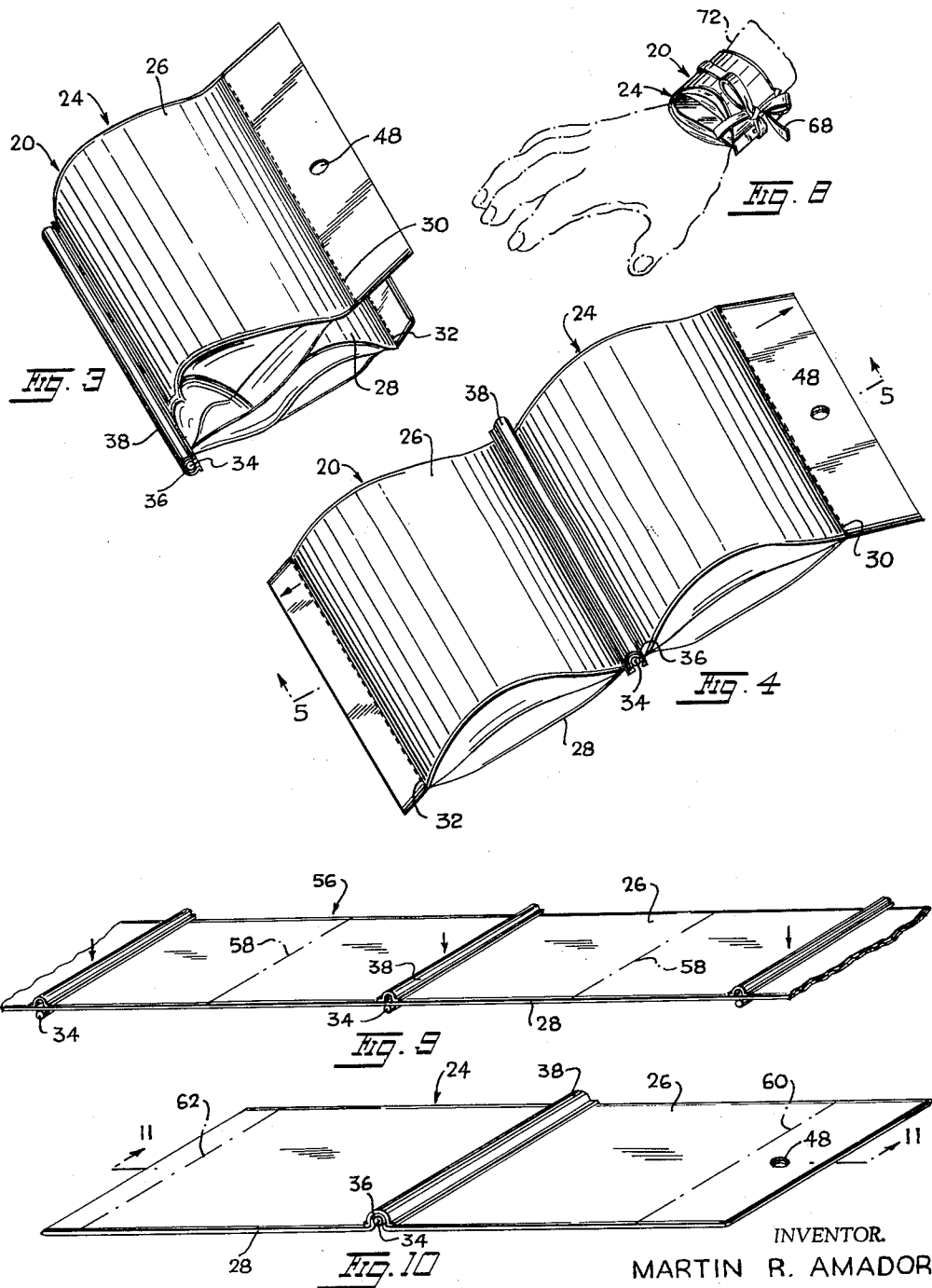
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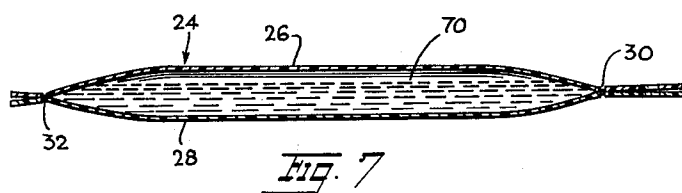
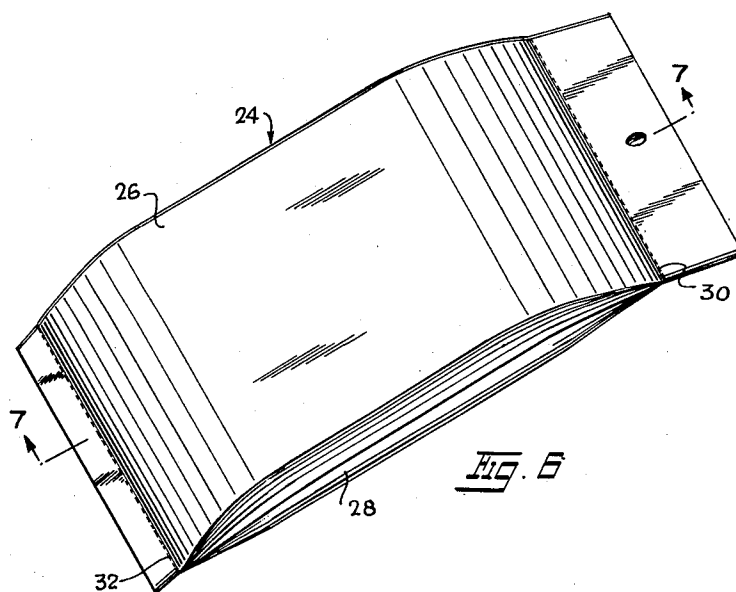
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CHEMICAL REFRIGERANT PACKAGE

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3 Sheets-Sheet 3



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CHEMICAL REFRIGERANT PACKAGE

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1 Claim. (Cl. 62-4)

This invention relates to a chemical refrigerant device adapted to be used as an ice pack or bag or the like, and to a package for marketing the device.

In first-aid situations, such as after an accident or injury to a person, the first aid required is often the quick application of ice or cold therapy to the injured site but as often occurs no ice is available at the place and time, and precious time is lost obtaining the necessary ice; and, when the ice is obtained, it must be enclosed in an enclosure such as a towel or bag, which enclosure is not always available, and further valuable time is lost in obtaining the enclosure.

It is accordingly an important object of the present invention to eliminate the foregoing disadvantages by providing a chemical refrigerant device that can be readily stored in convenient places and carried on the person, and that is adapted for instant use under all conditions and to any part of the body of a person.

Another object of the invention is to provide such a chemical refrigerant device that can be stored in a small space or suspended from a nail or the like on a vertical supporting surface before or after it is conditioned for use.

A further object of the invention is to provide such a chemical refrigerant device that is readily conditioned for use and readily applied to any part of the body of a person by an unskilled person.

Yet another object of the invention is to provide such a chemical refrigerant device that is simple in construction and that can be manufactured and sold at a reasonable cost.

Broadly the invention comprises an elongated rectangular-shaped envelope adapted to be squeezed and temporarily sealed transversely at its midlength to form separate compartments. One compartment is filled with a dry refrigerating substance such as granular ammonium nitrate. The other compartment is filled with water or other hydrous fluid. By eliminating the seal, the two compartments are brought into communication with each other so that the contents of the compartments are automatically mixed causing an endothermic chemical reaction which reduces the temperature of the water or fluid. Ready, positive and simple means are provided for forming the seal and for eliminating or dissolving the seal when desired.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a top perspective view of a chemical refrigerant package embodying my invention.

FIG. 2 is a cross-sectional view taken on the line 2-2 of FIG. 1.

FIG. 3 is a top perspective view of the compartmented chemical refrigerant device removed from the package, in folded condition.

FIG. 4 is a top perspective view of the refrigerant device of FIG. 3 in flat spread out condition.

FIG. 5 is a longitudinal sectional view taken on the line 5-5 of FIG. 4.

FIG. 6 is a top plan view of the refrigerant device of

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FIG. 3 after the seal is removed and the device is transferred into a single compartment ready for use.

FIG. 7 is a longitudinal sectional view taken on the line 7-7 of FIG. 6.

FIG. 8 is a perspective view of the refrigerant device of FIG. 6 applied to the wrist of a person.

FIG. 9 is a top perspective view of an elongated strip of stock from which the envelope and sealed refrigerant device of FIG. 3 are made, showing one step in the manufacture thereof.

FIG. 10 is a similar view showing the last step in the manufacture of the envelope of the device.

FIG. 11 is a longitudinal sectional view taken on the line 11-11 of FIG. 10, with the end edges turned away from each other.

FIG. 12 is a cross-sectional view taken across a modified form of seal device for forming the compartments of the device.

FIG. 13 is a view similar to FIG. 12 of another modified form of seal device.

FIG. 14 is a view similar to FIG. 12 of still another modified form of seal device.

FIG. 15 is a view similar to FIG. 12 of yet another modified form of seal device.

Referring in detail to the various views of the drawings, in FIG. 1 there is shown a chemical refrigerant device embodying my invention indicated generally at 20, and packaged for marketing. The package is indicated by the reference numeral 22.

The refrigerant device 20 per se is best shown in FIGS. 3 and 4 and comprises an elongated rectangular-shaped envelope 24. The envelope 24 is preferably formed from seamless tubing of flexible, preferably opaque sheet plastic material. The envelope has a front wall 26 and a rear wall 28, the walls being sealed across by heat and pressure along a line 30 at one end and across and adjacent the other end along a line 32. The line 30 is farther inwardly from its respective end than line 32 is from its respective end. The remainder of the walls are detached from each other.

At a point midway the ends of the body, the front and rear walls are sealed transversely by a sealing device constituted by a round plastic rod 34 constituting a core extending across one side of the body of the envelope midway its ends and protruding slightly beyond both long edges of the walls. The rod is pressed into the material of the envelope forming a transverse loop 36 of material which is clamped to the rod by means of a removable clamping bar 38, semicircular in cross section, with flanges 40 along its edges. The clamping bar is formed of resilient plastic material. The sides and flanges of the clamping bar pinch and press the looped material of the front and rear walls to each other and against the round rod 34, forming a seal and a flexible joint 42 across the envelope at such point, thereby dividing the envelope into an inner compartment 44 on one side of the seal and joint and into another inner compartment 46 on the other side of the seal and joint. A hole 48 is formed in the juxtaposed ends of the front and back walls outwardly of the seal line 30.

The pressure exerted by the clamping bar 38 should be sufficiently great so as to permit machine packing of the package. The bar should not readily slip off during fabrication of the package, envelope or prior to its removal by the user.

In the compartment 44, there is a supply of a dry refrigerating substance such as granular ammonium nitrate 50. In the other compartment 46, there is a supply of water or other hydrous fluid 52. The nitrate 50 and fluid 52 are separated from each other by the sealed joint therebetween.

In the manufacture of the chemical refrigerant device 20, the envelope 24 is formed by cutting same from the tubular strip 56 of plastic stock material such as shown in FIG. 9. The strip 56 is marked off at spaced intervals therealong as indicated at 58, the space between adjacent lines representing the length of the envelope 24. Midway between adjacent lines 58, the round rod 34 is placed across the material on one side thereof, and opposite the rod 34 on the other side of the material, the clamping bar 38 is placed. Automatic or manual pressure is brought to bear against bar 38 in the direction of the arrows in FIG. 9 whereby the material around the rod 34 is looped to form the loop or fold 36 thereby clamping a portion of the envelope to the rod 34 thus forming the seal and joint across the material as shown in FIG. 10. The nitrate 30 and fluid 52 are then inserted through the open ends of the envelope and the envelope next sealed by heat and pressure along the end lines 60 and 62 in FIG. 10, thereby forming the seal lines 30 and 32 of FIG. 4, after which the hole 48 is formed.

In order to permit convenient and rapid mixing of the nitrate 50 and fluid 52, it is desirable not to fill the compartments to their full capacity. It is also desirable to exclude air, especially major quantities thereof, from the interior of the bag or compartments.

In marketing the chemical refrigerant device 20, the device is folded along the joint between the compartments 44 and 46 and placed in a substantially square transparent sealed cellophane envelope 66 shown in FIGS. 1 and 2. An elongated flexible tape or ribbon 68 of sheet plastic material or fabric is suitably folded and placed in the envelope for taping the device 20 onto the particular part of the body of a person where needed.

In use, the chemical refrigerant device 20 and ribbon 68 are removed from the sealed plastic envelope 66. The device 20 may be hung on a nail pending use by means of the hole 48. In using the device, the seal and joint must be removed or dissolved from between the compartments 44 and 46 so that communication is restored between said compartments. This is accomplished by grasping hold of the ends of the envelope 24 adjacent the sealed lines 30 and 32 and pulling the ends away from each other in the direction of the arrows shown in FIG. 5. By so doing, the flexible clamping bar 38 is spread apart thereby releasing its pressure, whereupon it flies off of the looped material and rod 34 and continued pulling in opposite directions will cause the looped material to straighten out and the rod 34 to fall away from the envelope, thereby establishing communication between the compartments 44 and 46.

In order to mix the nitrate and fluid, either the nitrate or fluid is squeezed by the hands of the user into the other, preferably working from opposite corners of the compartments in alternation until the substances have been thoroughly and rapidly mixed forming a compound 70 which reduces the fluid thereby forming the refrigerant envelope 24 as shown in FIGS. 6 and 7. The envelope 24 is now ready to be applied to the needed part of the body of a person, such as the wrist 72 as shown in FIG. 8. The envelope is looped or wrapped around the wrist and tied in this condition by means of the ribbon 68.

In FIG. 12, a modified form of seal device for forming the compartments 44 and 46 is shown. This seal device differs from the seal device of FIGS. 1 to 11, inclusive, merely in that the center of the clamping bar 38' is thickened which prevents the clamping bar from buckling transversely, and facilitates slipping the bar over the looped material.

Another modified form of seal device is shown in FIG.

13. This form differs from the form shown in FIG. 12 in that an elongated resilient pad 74 is interposed between the rod 34' and the loop 36' of the material of the envelope. The pad 74 extends the length of the rod 34' and forms a resilient seal therealong.

In FIG. 14, still another modified form of seal is shown wherein the core rod 34^a is substantially rectangular in cross section with downwardly and inwardly slanting side surfaces 76 terminating in opposed curved corners 78 extending the length of the rod, the corners merging into lateral flanges 80. A central groove 82 is formed in the top of the body of the rod 34^a forming curved beaded portions 84, 84 therealong. The clamping bar 38^a is shaped to conform to the shape of the rod 34^a with the sides thereof slanting inwardly and with its flanges 40^a clamping the material of the envelope to the flanges 80 of the rod. A downwardly extending bead 86 depends from the center of the top of the bar 38^a clamping the material of the loop 36^a of the envelope into the central groove 82 and forming a seal therealong.

Still another modified form of seal and joint is shown in FIG. 15 wherein the core rod 34^x is formed with a central bore 90. In this seal, the material of the walls 26^x and 28^x of the envelope 24 is folded transversely upon itself forming a loop 36^x having four plies of folded material over which the clamping bar 38^x is clamped.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

A chemical refrigerant device comprising a substantially flat envelope having the material thereof folded along a line midway the ends thereof, said fold extending across the width of the envelope to form a transverse dividing line that separates the envelope into two compartments, one of said compartments having granular material, the other compartment having a fluid, said fold enveloping a rod constituting a core extending the full width of the envelope, a removable clamping bar of generally U-shaped configuration substantially coextensive in length with the core rod engaging said core rod over an effective clamping surface and clamping a section of the material of the envelope to form a tight seal between said compartments, said core rod being detached and said fold of material being straightened out by pulling on opposed ends of the envelope thereby breaking the seal, said clamping bar being semi-circular in cross-section with a thickened strengthened section at its center to prevent transverse buckling thereof, and an elongated resilient pad extending the length of said fold core rod and clamping bar and interposed and confined wholly between the fold and said fold core rod in longitudinal alignment with the thickened section of the clamping bar and of less widthwise extent than the contact of the fold with the fold core rod and compressed thereby to effect a seal therebetween with said thickened section of said clamping bar applying a sealing force against said resilient pad to retain the same against the envelope fold to form a fluid tight seal thereat and with said core rod enveloped in said fold.

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