

June 4, 1963

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3,092,112

THERAPEUTIC COMPRESS

Filed Oct. 17, 1960

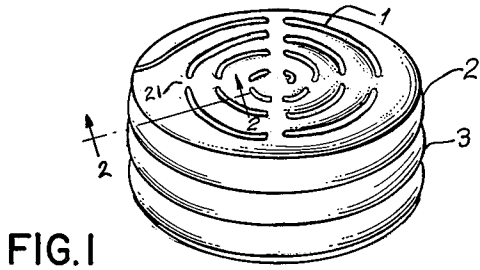


FIG. 1

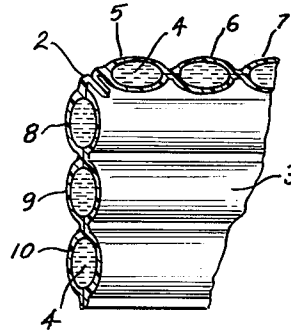


FIG. 2

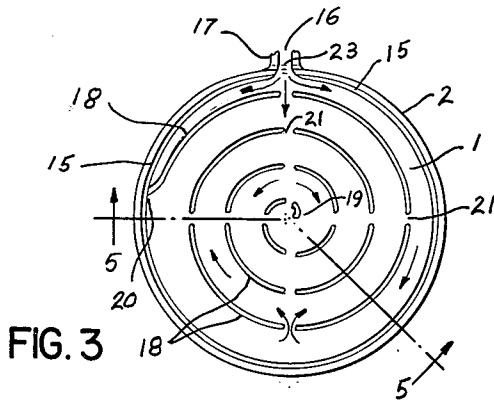


FIG. 3

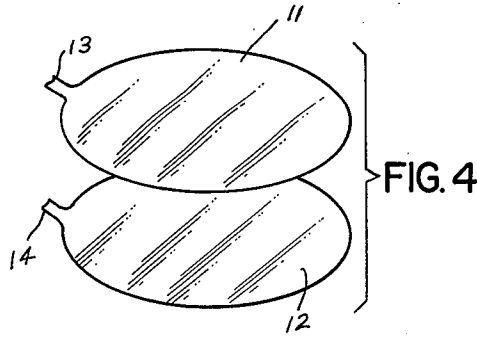


FIG. 4



FIG. 5

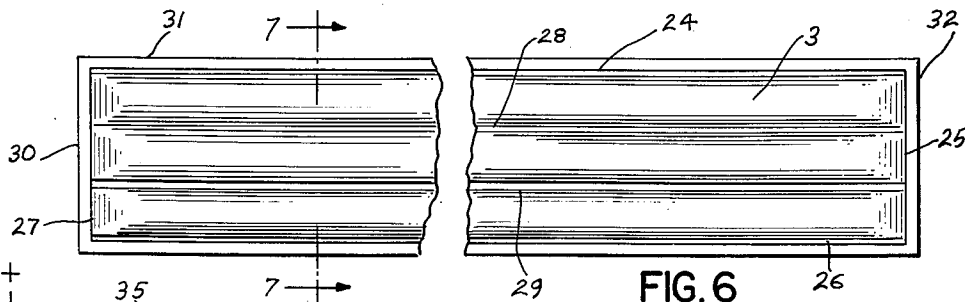


FIG. 6

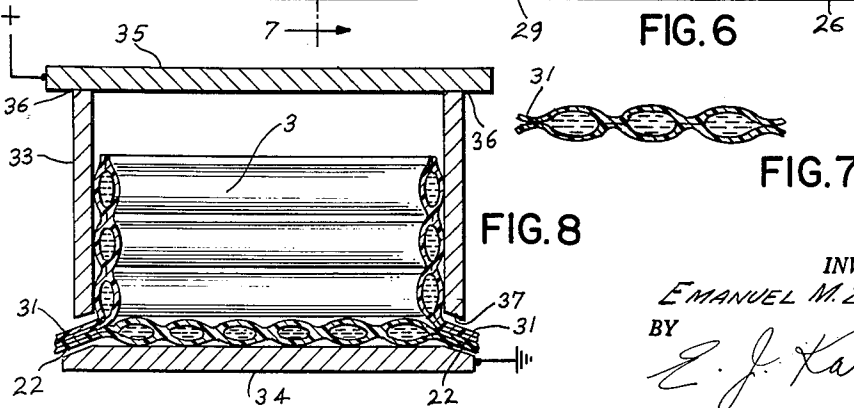


FIG. 7

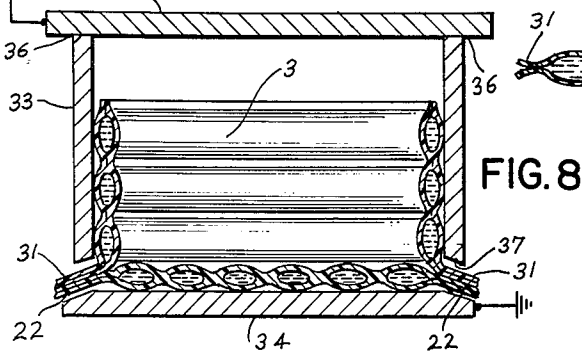


FIG. 8

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THERAPEUTIC COMPRESS

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Filed Oct. 17, 1960, Ser. No. 62,999

2 Claims. (Cl. 128—403)

This invention relates to therapeutic devices, e.g. therapeutic compresses or envelopes, and to a method for the production thereof, and, in particular, to a therapeutic head covering of resilient elastomeric material having a plurality of compartments containing an hermetically sealed liquid.

Therapeutic devices, such as cold and hot compresses, are well known in the art for the treatment of various exterior portions of the body where it is desirable to remove or add heat to a particular part thereof. In some instances, it may be desirable to use a hot compress to treat a body portion adversely affected by muscular or other stiffness and in other instances to use a cold compress to treat certain toxic conditions, such as headaches and the like.

In the treatment of some forms of headaches, ice bags have been proposed as cold compresses. Generally, such bags comprised a closed sack of resilient material, e.g. rubber having a capped opening therein into which ice or a cool liquid is inserted and the bag contacted to that portion of the head adversely affected by the discomfort. The bags or compresses were usually of such structure and configuration that it was difficult to treat easily that portion of the head affected. Generally, there would be a shifting of the contents within the bag because of the wearer's body movement thereby requiring frequent adjustments in the position of the bag and its contents. In instances where discomfort appeared to be located near the back of the left or right side of the head, as frequently occurs with certain types of headaches, it was difficult to maintain a uniform application of the coolant without the coolant shifting away from the area during the application of the compress.

Certain types of low freezing liquids, e.g. alcohol or water mixed with certain organics, have been proposed hermetically sealed within a thermoplastic envelope, but these liquids had certain disadvantages in that they somehow left the envelope after a period of time or were subject to mold formation whereby the envelope would become useless and had to be discarded.

I have now found that I can overcome the foregoing difficulties and disadvantages by providing a therapeutic compress with a hermetically sealed liquid capable of use for prolonged periods of time without losing to any degree the liquid therein, whether used as a hot or cold compress.

In particular, I may provide an envelope or therapeutic head covering characterized in that it covers or surrounds somewhat the whole of the head in substantially intimate contact therewith, whether at the top, the front, the sides or the back of the head.

In addition to the foregoing, I provide as a therapeutic compress an envelope of resilient material having hermetically sealed therein an organic liquid characterized by resistance to mold formation, low vapor pressure, low freezing point, a boiling point above water preferably above 120° C. the resilient material being substantially non-pervious to said organic liquid.

It is therefore the object of this invention to provide a therapeutic compress comprising an envelope of resilient material having a liquid hermetically sealed therein.

Another object is to provide a therapeutic head covering formed of a plurality of compartments filled with a liquid.

It is a further object to provide a method of making a

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therapeutic compress and, in particular, a therapeutic head covering.

A still further object is to provide a therapeutic compress comprising an envelope of resilient material, preferably a thermoplastic material, filled with a liquid resistant to mold formation and the like.

These and other objects will more clearly appear from the following specification and the accompanying drawings, wherein:

FIG. 1 shows in three dimensions the exterior view of a preferred type of therapeutic compress in the form of a crown or head covering having a plurality of elongated compartments filled with a liquid;

FIG. 2 is a cross section taken along line 2—2 of FIG. 1;

FIG. 3 is illustrative of the top element of the head covering preparatory to the production of the final article;

FIG. 4 shows the elements employed in producing the top crown portion of FIG. 3;

FIG. 5 is a cross section taken along line 5—5 of FIG. 3 looking in the direction of the arrows;

FIG. 6 depicts the side element of the head covering adapted to be joined to the element of FIG. 3;

FIG. 7 is a cross section taken along line 7—7 of FIG. 6;

FIG. 8 shows one method of joining the elements of FIGS. 3 and 6 together in the production of the head covering.

Referring to the drawing, FIGS. 1 and 2 show one embodiment of an envelope or compress in the form of a therapeutic head covering comprising a crown with top element 1 of a compartmented resilient material connected at its periphery 2 to compartmented side element 3, both preferably made of thermoplastic polyvinyl chloride and both inflated with an organic liquid 4, for example 1,2-propanediol, as shown in compartments 5 to 7 in the top element (note FIG. 2) and compartments 8 to 10 in the side element.

The liquid employed is one which does not react with the envelope material, has a low vapor pressure at ambient temperatures, e.g. not exceeding several mm. of mercury referred to 20° C. preferably not exceeding 2 mm. of mercury and more preferably below 1 mm. of mercury referred to 20° C. In addition, the liquid should have a freezing point below that for water and a boiling point exceeding that for water, preferably exceeding about 120° C., more preferably above 130° C. Moreover, the liquid should be one that does not ferment and will resist mold formation. I have found that the foregoing properties in combination are important in providing a long-lasting compress, that is, one that can be used as a hot compress by heating it in boiling water or used as a cold compress by cooling to below the ambient temperatures and even below the freezing point of water.

I have found that when liquids such as water or water in solution with organic liquids are used in hermetic contact with a thermoplastic envelope, there is a tendency for the liquid to leave the envelope. Tests have indicated that where a liquid has a vapor pressure substantially in excess of several mm. of mercury at ambient temperatures (water is 17.5 mm. Hg at 20° C.), loss results by the gradual diffusion of the vapor through the thermoplastic layer with which the liquid is in contact. For my purposes, the liquid known chemically as 1,2-propanediol is particularly advantageous in that it has a vapor pressure of about 0.07 mm. of mercury at 20° C., a boiling point of about 188.2° C., is liquid at sub-zero temperatures, is non-toxic, resists mold formation and is chemically compatible (i.e. substantially chemically inert) with thermoplastic envelope materials of the halogen modified type for prolonged periods of time without

substantially adversely reacting with the envelope material. Another useful liquid for my purposes is 1,3-propanediol.

The resilient material may comprise any elastomeric material which is substantially chemically inert to the liquid. As stated above, I prefer to use a halogen modified thermoplastic as the elastomeric material. Examples of halogen modified thermoplastic materials particularly useful for my purposes include polyvinyl chloride or copolymers thereof, poly-3-chlorobutadiene (neoprene), polychlorostyrene (chloroprene), polytetrafluoroethylene (Teflon) and the like.

In producing the therapeutic compress or device shown in the accompanying drawing, two portions 11 and 12 of a polyvinyl chloride sheath with extensions 13 and 14 and having the somewhat circular shape shown in FIG. 4 are superimposed together and heat sealed together electronically at circular periphery or band 15 (FIG. 3) except for a small opening 16 communicating with tongue 17 produced from extensions 13 and 14. The opposed sheaths are partially heat sealed together along arcuately curved lines or bands 18 which form interconnected compartments therebetween. The curved lines may be substantially concentrically arranged about the center of the top portion. As shown lines 18 spiral outwards from about the center 19 and terminate at periphery 15 as indicated at 20. The spiral is interrupted intermittently by spaces or gates 21 so that in effect the spirally configured or arcuately curved pathway comprises a group of interconnected compartments, this being preferred to facilitate the liquid filling of this portion of the device. As a preferred embodiment, it is desired that one group of gates 21 align with the opening 16 in tongue 17 so that, when liquid is passed through the tongue, a portion of it will follow the spirally configured pathway about the periphery towards the center as shown by the arrows while another portion of the liquid passes through gates 21 directly towards the center of the element. When fully inflated with liquid, the cross-section of the element has the configuration shown in FIG. 5, the left portion of the figure being taken through gates 21 and the right portion across lines 18. As shown in FIG. 5, a fin 22 remains to which the side portion 3 shown in FIGS. 1 and 6 is heat sealed. After the element of FIG. 4 is filled with liquid, the element is hermetically sealed at 23 and tongue 17 thereafter trimmed off.

The side element is prepared by superimposing two elongated sheets or strips of polyvinyl chloride together and heat sealing them peripherally along lines 24, 25, 26 and 27. Compartments are formed longitudinally by seal lines 28 and 29. The short edge 27 is sealed last after the side element is filled with liquid with fins 30, 31 and 32 provided to be used in the further construction of the head covering device.

In forming the device, the filled side element 3 is flexed about its transverse axis to form a cylinder and heat sealed together along fins 30 and 32 at the short edges. The somewhat cylindrically shaped element is inserted into a bucket die 33 (FIG. 8) of copper of cylindrical shape and fin 31 radially extended over and outward from the bottom edge of the die. Top element 1 of FIG. 3 is placed flat upon a grounded platen 34 of a high frequency electronic heat sealing apparatus with its fin 22 radially extending outward from beneath the edge of the bucket die in intimate contact with radially extending fin 31 of the side element. An electrically connected contact plate 35 is brought down in contact with the bucket die 35 at 36 and pressure applied so that bottom edge 37 of the die engages the fins tightly while high frequency current is applied for a time sufficient to generate the heat required at the point of high resistance between the die 33 and platen 34. Upon completion of this step, the platens are separated and the head covering thus produced removed from the die. The slight incline at the bottom edge of bucket die 33 enables the produc-

tion of a seal from which the excess fin can be easily removed by tearing.

After trimming off any excess fins, the completed head covering has the configuration shown in FIG. 1 after turning it inside out.

In producing the therapeutic compress, I prefer to use an elastomeric material which is transparent. This enables using liquids dyed in various colors, particularly the liquid known chemically by the name, 1,2-propanediol.

It is apparent from the foregoing that a therapeutic compress is provided capable of use for prolonged periods of the time. Thus, the invention provides as an article of manufacture a compress comprising an envelope of elastomeric material, whether from natural or artificial rubber, or from thermoplastic material such as halogen modified thermoplastic wherein the liquid in hermetic contact therewith is mold resistant, has a freezing point below that for water, a boiling point above that for water, a vapor pressure not exceeding several mm. of mercury referred to 20° C. and wherein the liquid and the elastomeric material are substantially inert with respect to each other. Preferably, the liquid has a boiling point above 120° C. and more preferably above 130° C.

In addition, the invention provides as an article of manufacture a therapeutic head covering device comprising a crown having a top portion of opposed sheets of elastomeric material partially sealed together along spaced lines which define compartments therebetween and a continuous side portion integral with the periphery of the top crown portion and extending downwardly therefrom, said side portion also comprising opposed sheets of elastomeric material partially sealed along spaced lines which also define compartments therebetween, the compartments of both the top and side portions of the head covering being hermetically filled with a liquid, the said liquid and the elastomeric material being substantially inert with respect to each other. In a preferred embodiment, the compartments of the top portion of the crown are arcuately configured about the center of the top portion and may take the form of a spiral pathway.

Moreover the invention provides an improved method of producing a compress wherein the liquid filler in hermetic contact with said material is mold resistant, has a freezing point below that for water, a boiling point above that for water, a vapor pressure referred to 20° C. not exceeding several mm. of mercury and wherein said liquid and said elastomeric material are substantially inert with respect to each other. Preferably, the liquid is one having a vapor pressure below 1 mm., e.g. below 0.5, such as 1,2-propanediol.

While the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and the appended claims.

What is claimed is:

1. A method of producing a therapeutic head covering of elastomeric material comprising a crown having a top portion with a downwardly extending side portion integral with the periphery of said top portion which method comprises providing in matching relationship opposed sheets of elastomeric material for said top portion, sealing said sheets together peripherally except for an opening therein while providing a fin therearound, additionally sealing said sheets along spaced lines within the area bounded by the peripheral seal, said spaced lines defining a plurality of interconnected compartments, inflating said top portion with a liquid filler through the peripheral opening and hermetically sealing said liquid by sealing off said peripheral opening, providing opposed

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5 sheets of elastomeric material of substantially elongated configuration for said side portion, peripherally sealing said sheets together except for an opening along an edge while leaving a fin at least along another edge of the side portion, additionally sealing said sheets together along spaced longitudinal lines within the periphery to form compartments therebetween, hermetically inflating said side portion with a liquid filler through the opening of said one edge, flexing said inflated side portion about its transverse axis and joining the opposed short edges together to form a continuous rim, and then sealing said side portion to the periphery of said top portion along their respective fins.

2. A method of producing a therapeutic head covering of thermoplastic material comprising a crown having a top portion with a downwardly extending side portion integral with the periphery of said top portion which method comprises providing in matching relationship opposed sheets of a halogen modified thermoplastic material for said top portion, sealing said sheets together peripherally except for a small opening therein while providing a fin therearound, additionally sealing said sheets along spaced lines within the area bounded by the peripheral seal, said spaced lines being arcuately configured and disposed about the center of said top portion and defining a plurality of interconnected compartments, inflating said top portion with a liquid filler through the peripheral opening and hermetically sealing said liquid by sealing off said peripheral opening, providing opposed sheets of halogen modified thermoplastic material of substantially elongated rectangular configura-

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tion for said side portion, peripherally sealing said sheets together except for an opening along a short edge while leaving a fin at least along a long edge of the side portion, additionally sealing said sheets together along spaced longitudinal lines within the periphery, hermetically inflating said side portion with said liquid filler through the opening of said short edge, flexing said rectangular side portion about its transverse axis and joining the opposed short edges together to form a continuous rim, and sealing said side portion to said top portion along their respective fins, the hermetically sealed liquid being non-aqueous mold resistant and having a freezing point below that for water, a boiling point above that for water, a vapor pressure referred to 20° C. not exceeding about several mm. of mercury, said liquid and said thermoplastic material being substantially inert with respect to each other.

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