March 16, 1965 W. DUBILIER ETAL 3,173,419

RELAXER DEVICE

Filed July 10, 1962 3 Sheets-Sheet 1

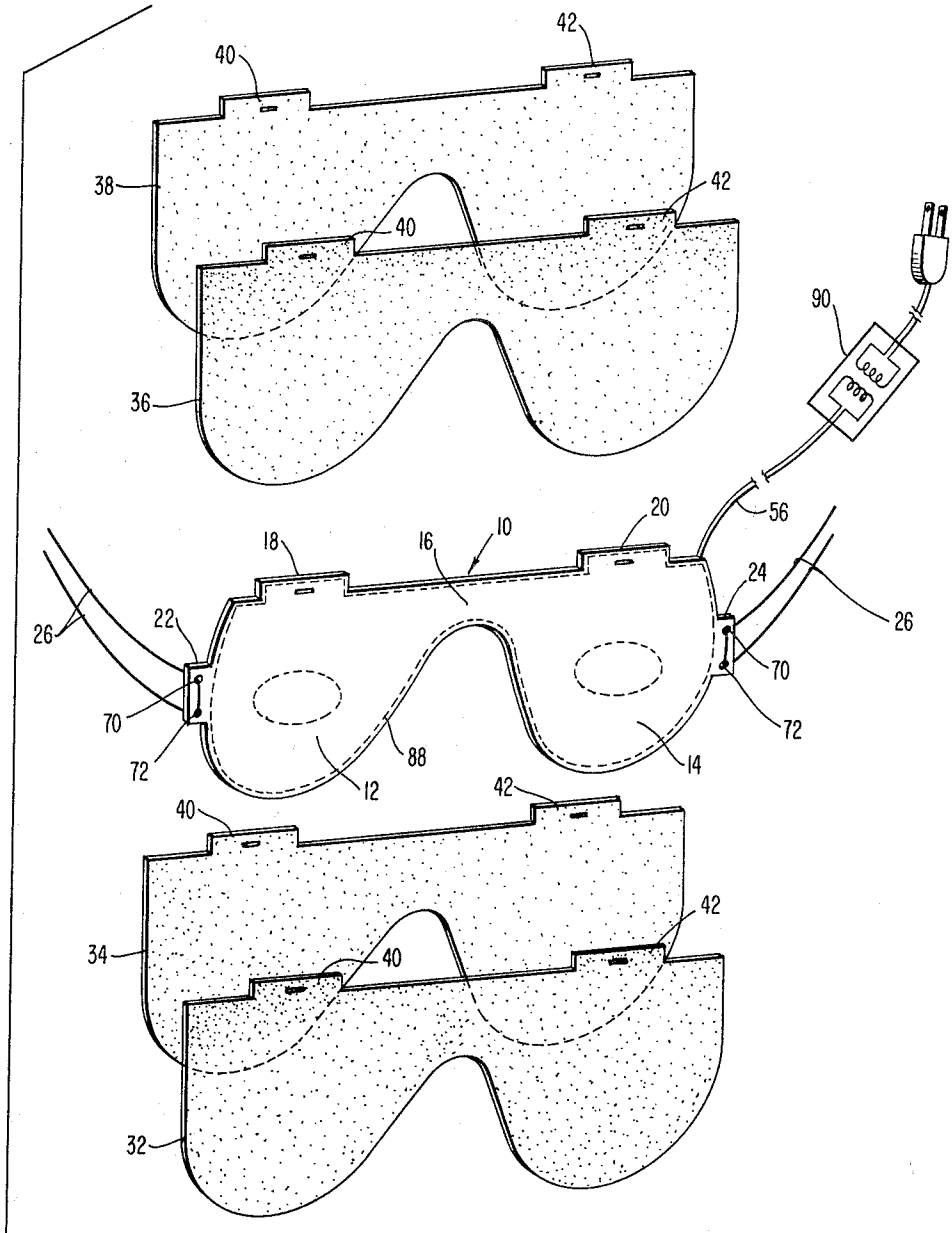

FIG. 1

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RELAXER DEVICE

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Fig. 2

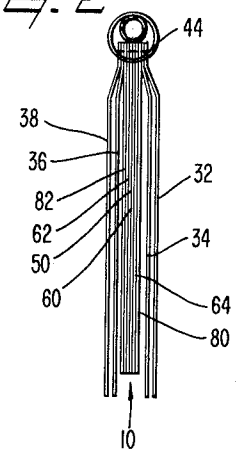
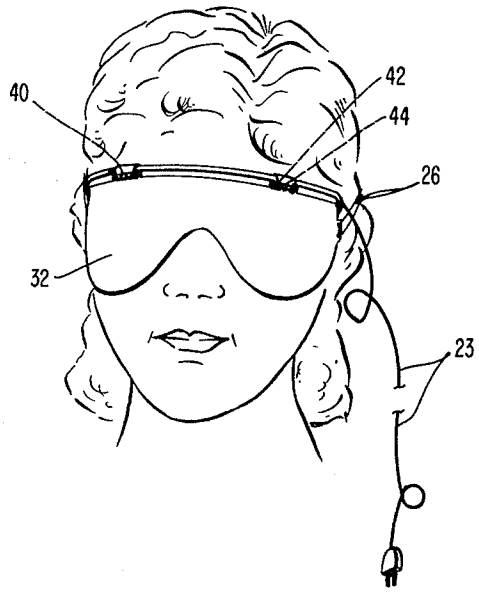


Fig. 3



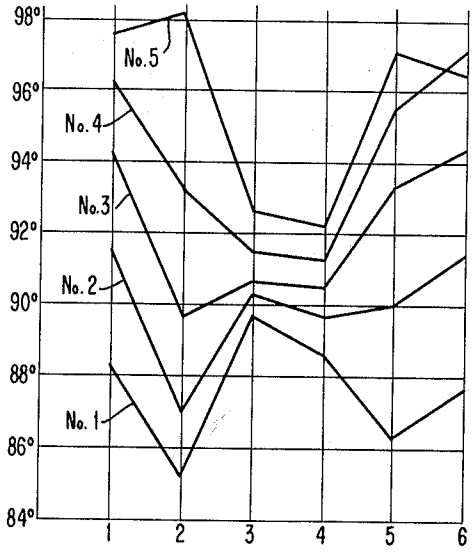
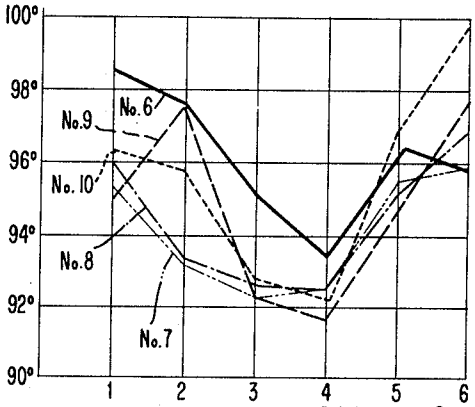


Fig. 5a

Fig. 5b



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Filed July 10, 1962 3 Sheets-Sheet 3

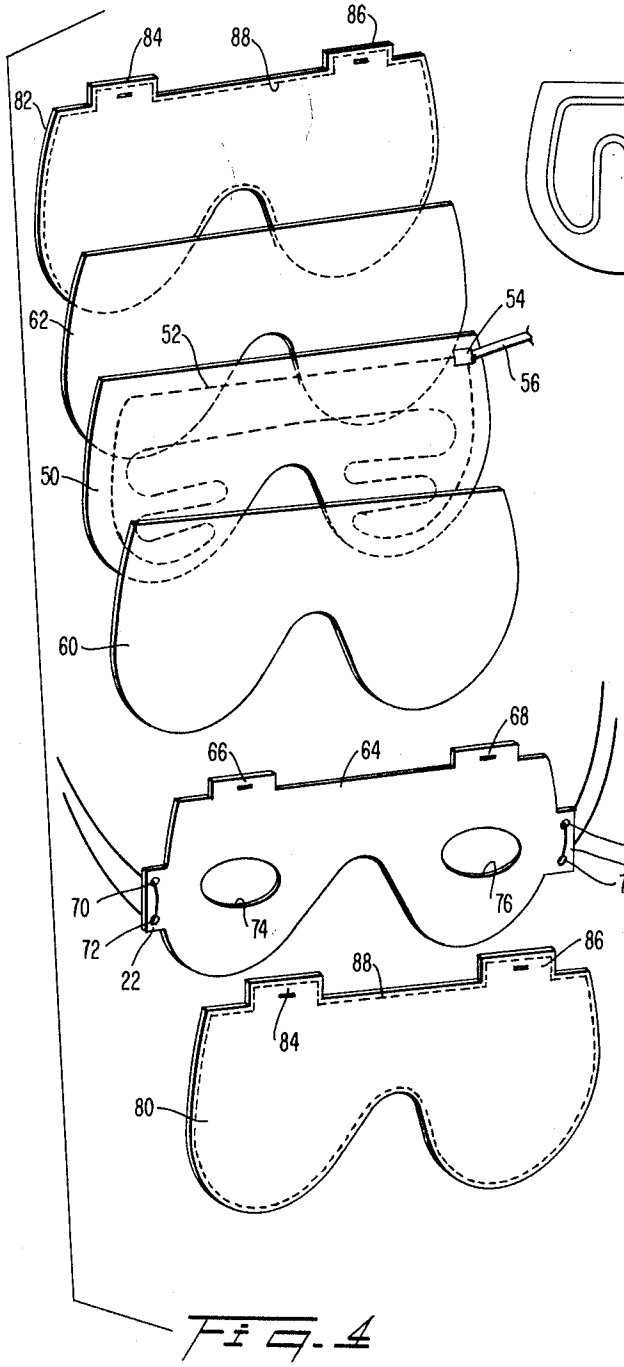

Fig. 4

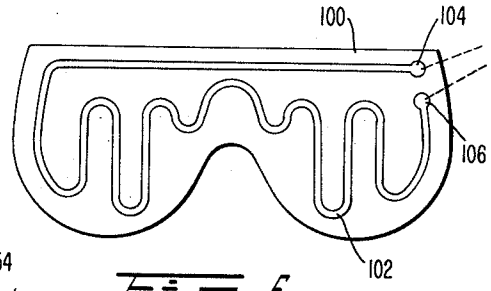

Fig. 6

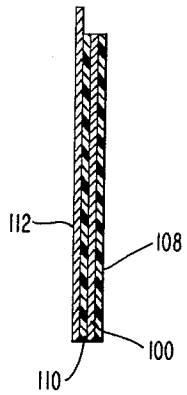

Fig. 7

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United States Patent Office 3,173,419 Patented Mar. 16, 1965

3,173,419
RELAXER DEVICE

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Filed July 10, 1962, Ser. No. 208,881
8 Claims. (Cl. 128—399)

This invention relates to a therapeutic device and particularly to an improved construction for a therapeutic device adapted to promote relaxation, sleep and other desirable states.

This application is a continuation-in-part of application Serial No. 192,779 filed May 7, 1962, and now abandoned.

It is well known that a considerable number of persons suffer from a lack of sleep which is largely attributable to an inability to relax.

The subject invention may be briefly described as an improved construction for a therapeutic device for the promotion of relaxation and inducing of sleep by application of selectable amounts of heat in the areas adjacent to the eyes. In its broad aspects, the subject construction permits heat control by the selective positioning of insulating laminae relative to a composite heat source lamina and the eyes and adjacent sinus areas to be exposed to such heat, all to the end of effecting muscle relaxation and other beneficial therapeutic effects, particularly for persons whose eyesight may be defective or be under strain.

Among the advantages attendant the subject invention is a simplicity of construction with a minimum required number of electrical components which permits apprecable economies of manufacture, a uniformity of heat distribution, a permitted control of the amount of applied heat by the user in accordance with his needs or desires in a simple manner and the permitted inclusion, due to its electrical simplicity, of safety features which permit its utilization without appreciable hazard in the event of possible malfunction associated with the electrical heat generating components thereof.

The principles underlying the invention will be hereinafter exemplified in conjunction with an embodiment in the nature of an opaque unit adapted to selectively cover and apply heat to the areas adjacent to the eyes, such being presently contemplated by the inventor as the best mode for carrying out the invention. Such a unit is of appreciable benefit for, among other things, the promotion of relaxation, thus enhancing the possibility of sleep, by warming the muscles below and around the eyes, especially with persons whose eyesight may be defective and be under strain.

The object of this invention is the provision of an improved construction for a therapeutic device adapted to apply selectable amounts of heat to the areas adjacent the eyes.

Referring to the drawings:

FIGURE 1 is a semi-diagrammatic exploded perspective view of a therapeutic device incorporating the principles of this invention;

FIGURE 2 is a schematic vertical sectional view of the device shown in FIGURE 1 in assembled relation;

FIGURE 3 is a perspective view showing the device in position on a subject;

FIGURE 4 is a semi-diagrammatic exploded perspective view of the components of the heating core lamina.

FIGURES 5*a* and 5*b* are graphs of temperature variations.

FIGURE 6 is a plan view of an alternate construction for a central lamina supporting a heating element.

FIGURE 7 is a vertical section schematically illustrating the inclusion of the central lamina as shown in FIGURE 6 in a core lamina.

In its broad aspects, the illustrated device may be considered as a contoured multilamina pad or mask of suitable shape for covering the upper part of the face and eliminating light from the eyes and adapted to selectively provide a readily controllable amount of heat to the areas adjacent to the eyes when the mask or pad is in position.

As best shown in FIGURES 1 and 2, a preferred construction for such a device includes a centrally disposed heat generating or core lamina, generally designated **10**, having a pair of major warming areas **12**, **14** shaped to generally overlie the eyes, sinuses and adjacent portions of the upper face, joined by a bridge piece **16**. The core lamina **10** contains a heating element, suitably an electrical resistance heating element, as will be hereinafter described in detail. The top edge of the core lamina **10** is provided with a pair of spaced extensions **18**, **20** and the side portions thereof include a pair of extending wings **22**, **24** to which is secured an elastic or other suitable strap **26** to effect positioning of an assembled unit upon a user thereof.

Selective control of the amount of heat to be applied to the body surface is effected by the selective positioning of one or more of a plurality of laminae of soft, flexible insulating material, suitably thin flannel cloth or the like, relative to the core lamina **10** and to the surface to be warmed.

FIGURE 1 illustrates, by way of example, four such lamina **32**, **34**, **36** and **38** each being of similar shape as the core lamina **10** and with equal numbers thereof being disposed on either side thereof. Preferably each such lamina is sized so as to be slightly larger in planar extent than the core lamina so as to completely overlie the same and each is provided with complementally located extensions, generally designated **40** and **42** for collective securement to said core lamina **10**. The insulating laminae are collectively secured to the core lamina **10** in such manner as to be individually selectively positionable either intermediate the core lamina **10** and the skin surface or exteriorily of the core lamina to control the amount of heat radiatable into space. Such collective mounting is preferably effected by hingedly securing, as by sewing **44** or other suitable means, the extension **40** and **42** of the insulating lamina to the extensions **18** and **20** on the core lamina. Alternatively, the insulating lamina may be removably secured to the core lamina as by snap fasteners or press studs located in the extensions to provide for an increased degree of flexibility of temperature control by selective positioning of any desired number thereof on either side of the heat generating lamina **10** as well as readily permitting the removal of any one for cleaning in the event it becomes contaiminated through contact with medicaments applied to the skin surface.

Referring now to FIGURE 4, the core lamina **10** is preferably a composite unit which includes a central lamina of flexible insulating material **50**, suitably cloth. Mounted thereon is an electrical resistance heating element, suitably a predetermined length of thin resistance wire threaded therethrough as generally designated by the reference numeral **52**. The heating element **52** is of a character and length to provide a predetermined total quantum of heat under the conditions to be hereinafter described and the configuration thereof on the lamina **50** can be varied to provide for uniform heat application or for selective heat application in accord with the needs of the user. The heating element **52** is connected to external leads **56** through a suitable heat fuse element **54** which is formed of a metal adapted to melt and open the circuit whenever the temperature exceeds a predetermined selected limiting value.

The lamina **50** having the heating element mounted thereon is disposed intermediate two insulating layers **60**, **62** of similarly sized and shaped flexible insulating material, suitably thin cloth or paper. Positioned adjacent

to the insulating layer 60 is a lamina 64 of foil or other foil-like material of high heat conductivity. The lamina 64 is provided with a pair of extensions 66, 68 on its upper edge and a pair of side extensions 22, 24 each of which are preferably doubled back upon themselves and support pairs of eyelets 70, 72, through which the strap 26 or other securing means may be threaded. This lamina 64 serves to uniformly distribute the heat from the heating element and, as indicated, is provided with cut out sections 74, 76 in the eye overlying portions thereof to minimize the amount of heat applicable directly to the eyes.

Positioned exteriorily of the laminae 62 and 64 are a pair of cover lamina 80, 82. Such cover lamina 80 and 82 are provided with complementally spaced extensions 84, 86 on the top edge thereof and are of a planar extent sufficient to envelope, through peripheral securement thereof as by stitching 88, the laminae 62, 50, 60 and 64 and thereby provide a completely enclosed, save for the extensions 22 and 24, core lamina 10. The element 52 mounted thereon is sandwiched or disposed intermediate two thin insulating lamina 60, 62 of similarly shaped, flexible material. If desired, the peripheral edges of the laminae 80, 82 may be strengthened by the addition of a binding tape which also would serve to minimize fraying. Alternatively, the peripheral edge portions of the cover laminae 80, 82 may be adhesively secured together as by a suitable adhesive or plastic which serves not only to provide an adhesive connection therebetween but also tends to minimize undesired fraying of the edges.

Referring back to FIGURE 1, the unit is assembled, as hereinbefore described, by hingedly securing, as by stitching of the extensions 18, 20, 40 and 42, one or more of the curtain laminae 32, 34, 36, 38 to the core lamina 10, and by threading the strap 26 through the eyelets 70, 72 in the side extensions 22, 24.

In operation of the subject unit, the assembled unit is positioned on a user, as illustrated in FIGURE 3, with the heat distributing lamina 64 disposed intermediate the core lamina 10 and the skin surface. Selective control of the amount of heat applicable to the skin surface is readily effected, by the user thereof, by the mere interposition of a greater or lesser number of the curtain lamina 32, 34, 36, 38 both intermediate the heat generating core lamina 10 and the skin surface, and by the positioning of a greater or lesser number thereof on the outer side of the heat generating core lamina 10 to prevent or otherwise minimize undesirable heat radiation therefrom to space.

Among the advantages attendant the subject invention is the permitted utilization of low voltages to effect heat generation. In the subject unit, the resistance heating element 52 may suitably be operated at voltages in the neighborhood of 25 to 30 volts and therefore, if the normal 110 volt main voltage is to be utilized, a small low power transformer 90 can be integrally included in the external lead 56. Such operating levels make it both possible and convenient to employ a battery as a source of power, thus permitting utilization of the device at locations where conventional power supply outlets are not available.

As will be apparent to those skilled in the art, the subject construction provides a very simple device obviating the need for a rheostat or other regulator for regulating the amount of heat generated and with which a wide range of heat values are simply and inexpensively obtainable. As will also be apparent, the device may be readily connected to the supply voltage through a time cut out switch which could be preset to switch off the voltage after a suitable predetermined interval, long enough to allow the user, for example, to go to sleep has elapsed. Such, in addition to being a convenience to the user, would tend to prolong the life of the heating element 52.

By way of illustrative example only, the following discussed temperature variations have been obtained by rough tests on a handmade prototype model. Such values are advanced only to show that temperature variations at the skin surface are effected by the selective disposition of the curtain lamina 32, 34, 36, 38 and are not intended to be limiting in any manner. It should also be appreciated that the readings, which resulted from a rough test, are admittedly not entirely accurate due, at least in part, to the interposition of measuring devices between the device and the users skin and to the rough nature of the prototype model which did not allow the inner surface of the unit to seat in proper contiguous position relative to the skin surface.

The hereafter tabulated temperature readings, which are graphically reproduced in FIGURES 5*a* and 5*b*, were taken with a six contact thermo-couple which produced readings at six points or locations, three disposed below each eye, each time the composite make up of the mask or pad was altered by disposition of the curtain lamina as indicated. The point locations are numbered consecutively across the face starting from the right hand side, numbers 1–3 being disposed on one side of the nose and numbers 4–6 being disposed on the other.

Curve No.	Figures 5*a* and 5*b*	Degrees F.					
		1	2	3	4	5	6
1	Face Temp	88.25	85.1	89.78	88.7	86.36	87.5
2	Open Pad	91.58	86.9	90.32	89.78	89.96	91.4
3	1 lamina out	94.28	89.78	90.68	90.5	93.2	94.28
4	2 lamina out	96.35	93.2	91.58	91.22	95.54	97.16
5	3 lamina out	97.7	98.25	92.75	92.12	97.23	96.62
6	1 lamina in and 2 out	98.78	97.7	95.0	93.38	96.35	95.9
7	2 lamina in and 1 out	95.45	93.2	92.3	92.3	95.0	96.08
8	3 lamina in	96.08	93.38	92.75	92.3	95.0	96.98
9	2 lamina in	95.0	97.88	92.3	91.76	94.55	97.88
10	1 lamina in	96.44	95.72	92.84	92.12	96.8	99.68

The readings taken at points 3 and 4, which are those nearest to the subject's nose, are generally very much lower than the other reading due to the fact that these points were left partially uncovered by the mask or pad to detect the variation between between close covering and loose covering by the pad.

Referring to FIGURES 5*a* and 5*b* which plot these tabulated results, FIGURE 5*a* contains curves 1 to 5 inclusive showing temperature variations as follows:

Curve 1. Face temperature without covering.

Curve 2. Heated pad with maximum heat applied to face, no curtain lamina interposed, and no curtain lamina outside to prevent heat radiating into air.

Curve 3. Maximum heat applied, one lamina to prevent radiation.

Curve 4. Maximum heat applied, two lamina to prevent radiation.

Curve 5. Maximum heat applied, three lamina to prevent radiation.

FIGURE 5*b* shows curves 6 to 10 inclusive—the inter-

mediate temperatures obtained by positioning the flaps in other combinations, under the following conditions:

Curve 6. Maximum heat applied, one lamina in, two lamina out.

Curve 7. Maximum heat applied, two lamina in, and one lamina out.

Curve 8. Maximum heat applied, three lamina in.

Curve 9. Maximum heat applied, two lamina in.

Curve 10. Maximum heat applied, one lamina in.

FIGURE 6 illustrates the essentials of an alternate form of heating element supporting lamina that is presently preferred because of its low cost and avoidance of wire type heating elements. As there illustrated, there is provided an insulating lamina 100 suitably in the form of a thin and flexible sheet of an insulating plastic, preferably Mylar, having painted or otherwise deposited thereon a track 102 of a carbon compound resistance material, which may be readily formed of sufficient width and thickness as to carry the desired current and provide the desired resistance characteristics. The track 102 terminates in a pair of terminals 104, 106 to which the external leads, as indicated by the dotted lines, may readily be affixed by any suitable means.

As schematically shown in FIGURE 7, with exaggerated thickness, the above described lamina 100 is preferably secured, as by adhesive, intermediate a pair of thin insulating sheets 108, 110, suitably of the same material and nature, to provide a completely insulatingly encased unit, that is extremely thin and flexible in nature. In accord with the previous description, a lamina 112 of foil or other foil-like material of high heat conductivity is positioned adjacent to the insulating lamina 110 and the composite unit as so constituted is enclosed in a pair of cover lamina, not shown but similar to the heretofore described cover lamina 80, 82 to provide a core lamina 10 to which are secured the curtain lamina as heretofore described.

As will be apparent to those skilled in this art, the subject invention which has been herein described in conjunction with a preferred embodiment contoured to overlie the eyes and adjacent facial areas of a subject, can also be embodied in other contours and configurations in order to secure the desirable therapeutic effects on other body areas.

It will be appreciated that the above has been described by way of example only and that the construction may be modified in various ways within the scope of the invention.

Having thus described our invention, we claim:

1. A therapeutic device for applying heat to a body surface comprising a heat generating lamina contoured to effect application of heat to a body area and a plurality of insulating lamina displaceably connected thereto selectively and individually positionable on either side of said heat generating lamina by a user of the device to control the amount of heat transferable from said heat generating lamina to a body area overlaid thereby.

2. A therapeutic device for applying heat to a body surface comprising a heat generating lamina contoured to overlay a body surface to which heat is to be applied and a plurality of insulating lamina hingedly secured to said heat generating lamina, each of which are selectively and individually positionable on either side of said heat generating lamina by a user of the device to control the amount of heat transferable from said heat generating lamina to the body area overlaid thereby.

3. The therapeutic device as set forth in claim 1 wherein said heat generating lamina contains an electrical resistance heating element.

4. The therapeutic device as set forth in claim 1 wherein said heat generating lamina contains a low voltage, low power electrical resistance heating element.

5. The therapeutic device as set forth in claim 1 wherein said insulating lamina are removably securable to said heat generating lamina.

6. The therapeutic device as set forth in claim 1 wherein said heat generating lamina includes means disposed adjacent to heat generating means for obtaining a uniform distribution of generated heat.

7. In a therapeutic device of the type including an electrically operable heat generating lamina for applying heat to a body surface, the improvement comprising a plurality of insulating lamina connected to the heat generating lamina and selectively and individually positionable on either side thereof by a user of the device to control the amount of heat transfer from said heat generating lamina to the body area overlaid thereby.

8. In a heating device, a thin basal lamina having an elongate pattern of electrical resistance heat generation means disposed in surface abutting relation therewith for providing a corresponding localized high temperature pattern, a highly conductive lamina disposed in adjacent and electrically insulating spaced relation to said heat generating means for dispersing said localized high temperature pattern into a substantially uniform pattern of heat distribution over the planar extent thereof and a plurality of insulating lamina displaceably connected to said conductive lamina and selectively and individually positionable on either side thereof by a user of the device to control the amount of heat transfer therefrom to a body area overlaid thereby.

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