April 11, 1939. D. ROBERTS 2,154,184

ELECTRIC HEATING MECHANISM

Filed Feb. 24, 1936

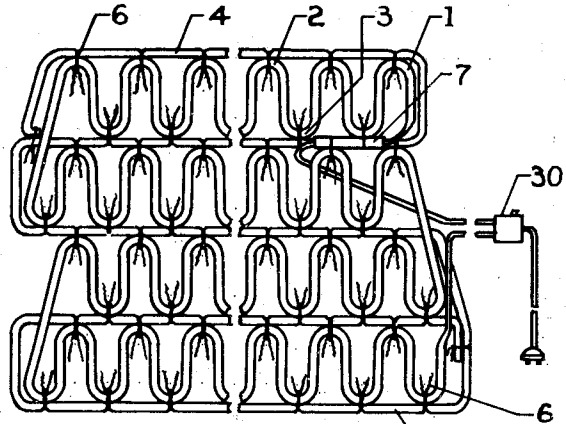

FIG. 1

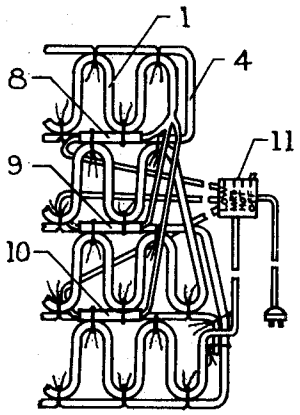

FIG. 2

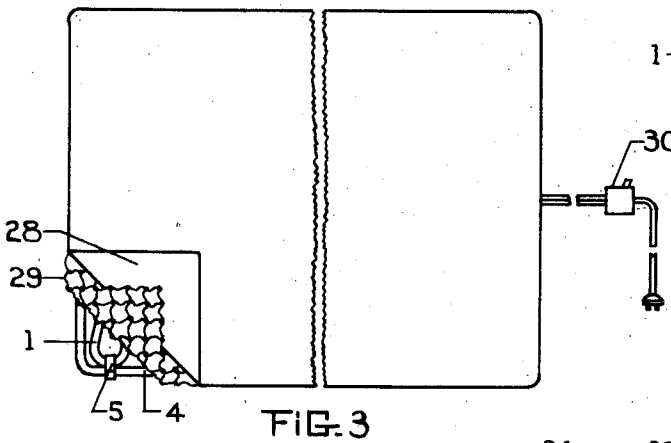

FIG. 3

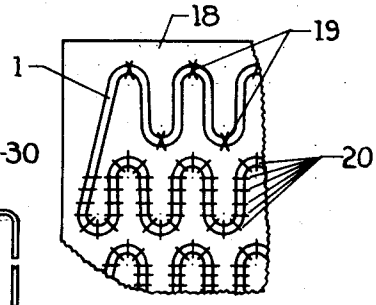

FIG. 4

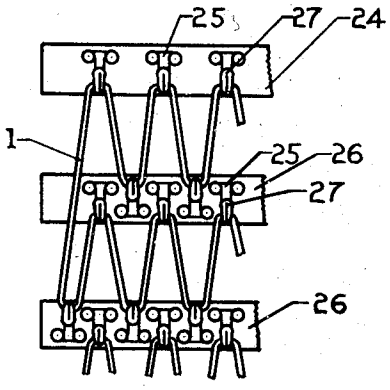

FIG. 5

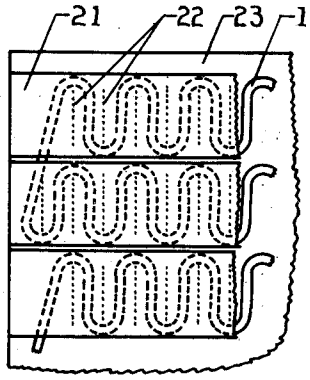

FIG. 6

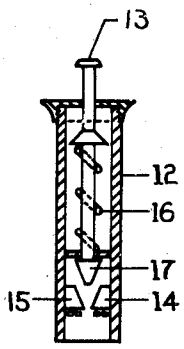

FIG. 7

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ELECTRIC HEATING MECHANISM

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26 Claims. (Cl. 219—46)

The present invention relates broadly to electric heating mechanisms and the construction of same, and particularly to electrically heated pads, blankets, clothing, and the like.

In the past, heating pads have been manufactured according to two general forms. One such form consists of what is known as the spiral construction. A strand of resistance wire, commonly covered with insulation, is started at the center of the pad, and fastened in place by sewing or otherwise, while same is laid in a substantially spiral pattern, the spiral being continued until the pad reaches the size desired. The other form that is in common use involves the laying of the strand of resistance wire back and forth completely across the pad or lengthwise of the pad, as the case may be, until sufficient of these elongated runs have been placed on the pad to give it the desired length. In both of these forms of construction, the standard practice is to sew the resistance wire in place between two plies of canvas or the like, which interferes with uniform heating over the entire area of the heating pad and causes what is commonly called "hot spots" in the pad. Pads made according to either of these forms are relatively satisfactory for some purposes, if used to supply low or moderate heat while laying flat, such as mere bed warmers. However, where it is desired to supply heat to a surface or area that is not substantially level, these pads are not wholly satisfactory, largely due to their stiffness and rigidity with resulting inability to follow the contours of the surface to be heated. The difficulty involved, due to such stiffness and rigidity when the pad is in use, is normally referred to as "bridging".

Heat is commonly prescribed, as a means of relieving congestion, pain, soreness, or injury. In order to effectively apply the heat, the heat supplying mechanism must readily conform to the contour of the surface to be treated. This calls for a heating mechanism having a pliability and normally high temperature capability that is not available or even possible in the present day electric heating pads or blankets.

In high temperature therapeutic treatments, one common practice is to dip a suitable towel or cloth pad in boiling water, wring it out, place it in a suitable cover, which may, for instance, be flannel, and then apply the so prepared pad to the patient at the point to be treated. This procedure is repeated at short intervals as the pad cools down. Such procedure obviously requires considerable equipment, is expensive due to the labor involved, and requires extreme care to keep the patient covered during the interval between applications, since patients catch cold very easily if the treatment is not very carefully handled. A much simpler and less expensive procedure, avoiding exposure of the patient, would be to supply heat by means of an electric pad or the like. However, up to the present time, this apparently has not been extensively done, mainly due to the fact that sufficiently pliable pads are not available, and such pads as are on the market are so constructed that they can safely handle only low wattages per unit area, with resulting moderate temperatures which are unsatisfactory for the bulk of the therapeutic treatments. The present invention removes these limitations by producing a pliable electric heating pad which may be constructed to safely furnish heat for therapeutic treatments, even at the relatively high temperatures required for some of such treatments.

It is, accordingly, among the objects of the present invention to produce a heating mechanism, pad, blanket or the like which is pliable in all directions and particularly in those directions that other heating mechanisms are relatively stiff. Another object is to produce a multi-section heating mechanism wherein each section is composed of a series of relatively short turns of an electric resistor element such as nichrome wire. Another object is to produce a heating mechanism wherein the sections are so mounted in parallel, that they hinge at the point where one section is joined to the next. Another object is to produce an electric heating mechanism which may be rolled or doubled up in use, or in storage, and yet which will not collapse, but will lay flat when unrolled or undoubled. A further object is to produce a heating mechanism for therapeutic use which will readily conform to the shape of the portion of the body on which it is to be used. A further object is to provide an electric heating mechanism suitable for use in pads, blankets, aviators clothing and leggings, and the like. A further object is to provide an electric heating mechanism wherein there is no direct contact between adjacent turns of the resistance wire, which substantially eliminates all danger of short circuiting. A further object is to provide a method of assembling the resistance wire in the heating mechanism, so as to eliminate slipping of the resistance wire out of place. A further object is to provide an elastic or resilient netting cover for the assembled turns of the heating element. A further object is to produce a heating mechanism which may be constructed to furnish relatively

high temperature heat for therapeutic use. A further object is to provide a pliable unit which may be rapidly assembled, is easy to repair, and relatively low in cost per unit area. Still further objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the products hereinafter fully described and particularly pointed out in the claims, the annexed drawing and the following description setting forth in detail several modes of carrying out the invention, such disclosed modes illustrating, however, but several of the various ways in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is an assembly view of one form of my multi-section heating element adapted to operate at a single temperature.

Fig. 2 is a partial view of the element shown in Fig. 1, but arranged for operation at three different temperatures.

Fig. 3 shows a completely assembled pad having an outside cover, and with one corner opened and turned back to show the unit and resilient cover thereover.

Fig. 4 shows two ways that the heating element may be fastened to a sheet type mounting which may be canvas, burlap, netting or the like.

Fig. 5 shows a modification where the heating element is laced on hooks mounted on tape which forms the hinge medium between sections.

Fig. 6 shows the heating element held in place by canvas strips sewed to a flexible backing in manner to provide a zig zag path through which the heating element may be threaded.

Fig. 7 shows a partially sectioned view of one form of switch that may be used with the electric heating mechanisms.

My improved electric heating mechanism is especially well adapted for use in therapeutic treatments. The pliability obtained by narrow sectional construction permits close contact to the entire surface to be treated, while the open or skeleton type construction is a decided aid in forming a unit which will permit relatively high temperatures to be attained. The use of a netting cover over the skeleton type sectional unit also facilitates the attainment of high temperatures and relatively evenly distributed heat by preserving a large percentage of the air space between turns of the heating element, and at the same time is of a distinct aid in producing a relatively soft pad or the like.

Referring more particularly to the drawing, the heating element 1 is assembled in the form of a multiplicity of sections to produce the improved heating mechanism. In Fig. 1 is shown an assembly of four such sections. The assembly of sections normally gives a unit which has ample strength to retain its form even under adverse use. However, if desired, the unit may be tacked or otherwise anchored to the cover so that it will be firmly held in place under all conditions. Each section is formed with a series of relatively short turns of the heating element 1, so as to preferably form an elongated section corresponding to the length required by the particular pad or other article to be formed. The width of the sections and size of turns of the heating element 1, depends somewhat on the particular use the pad is to be put to, and in particular the pad must have a pliability that will permit it to conform to the particular surface to be treated. A section width of two or two and a half inches gives a satisfactory pliability for most purposes. The turns of the heating element 1 in each section may be constructed with curves 2 and 3, as shown in Fig. 1 or the heating element 1 may be laid in a substantially triangular pattern, or even other patterns at the option of the maker of the heating mechanism. Each turn of the heating section is anchored to and butts up against a suitable durable soft cord, rope, or cable 4 which is preferably about the same size in diameter as the heating element 1. The anchoring may be done in various ways, for instance, by means of metal clips 5, as shown in Fig. 3, or by tying with a suitable cord 6, as shown in Fig. 1. Where the heating element 1 is tied to the soft cable 4, it preferably should be done in such manner that the two will not only be tightly held together to avoid slippage of one on the other, but the knot should be so made that it will not loosen in use. The number of sections to be used, and the length of each, obviously will depend upon the service that the pad is to be subjected to. With this type of construction the sections are joined to each other in such manner, that the soft cable 4 acts as a hinge allowing each section to be moved independent of or in conjunction with the adjacent section, thus producing a pliability not heretofore obtained by heating devices built according to the standard methods of construction described above. Thus the soft cable acts as an insulating hinge which holds the adjacent sections together, yet in spaced apart relation, without direct contact between the sections. My improved type of construction also permits the use of a somewhat heavier heating element 1 than is commonly used in the conventional constructed heating pads while substantially retaining the pliability attained by my new type of construction. The use of a heavier resistor wire or heating element 1 facilitates the attainment of higher temperatures and long life, and, moreover, the open or skeleton type construction increases the open or air space between turns which again facilitates an even distribution of heat, and the carrying of higher temperatures. I normally prefer to use an insulated heating element 1 of which there are many approved forms for sale on the open market, some of which are known to the trade as heater cable or heating pad cable. Whether the cable used is insulated, and if so, how much insulation there is thereon, will depend upon the particular requirements of the problem then at hand, as limited by underwriters specifications. The term "heating element" as used herein is to be understood to mean an electric resistance member with or without insulation thereon, as the case may be, unless specified to the contrary. By suitable and well known variations in weight of the heater cable, its insulation, et cetera, the heating mechanism may be made either quick heating or slow heating to fit the particular requirements of the therapeutic treatment prescribed. In any event the sectional construction gives a longer life mechanism due to its pliability and the elimination of sharp bends of the heater element 1 when same is closely placed on the surface to be treated. The heating mechanism may be provided with a thermostat 7 for maintaining the pad at a substantially constant single temperature. If desired the heating mechanism may be supplied with a series of thermostats set for operation at various temperatures. The use of thermostats 8, 9, and 10 with suitable switch 11, as shown in Fig. 2, may be used where a three heat pad is desired. It is thus obvious that one can attain whatever tem-

perature is desired merely by using a suitable number of thermostats with a suitable switch to connect same into the electric circuit of the heating mechanism.

While thermostats are commonly used in electric heating mechanisms, such as hot pads and the like, it is well recognized that thermostats are not infallible and, moreover, that they wear out in time. A thermostat, adapted to handle the relatively high wattages required by an electric pad or the like used for high temperatures or even large size equipment, is of a large size itself and in some cases undesirable, particularly where the having of a lump in the pad would interfere with its use. Where the heating mechanism is used for therapeutic purposes such as in high temperature treatments, I prefer to eliminate the thermostat, and use what is known as a momentary contact switch which is operated by the patient or attendant. One form of such switch is shown in Fig. 7. The switch preferably has a housing 12 of a size such that it can be readily held by the patient's hand with his thumb in contact with push button 13. The switch is provided with terminals 14 and 15 adapted to be connected in conventional manner in the electric circuit of the cord leading to the heating mechanism. A compression spring 16 serves to normally hold the push button 13 in the broken circuit position shown in the drawing. With the heating mechanism connected to a suitable outlet, it is only necessary to depress push button 13 until contactor 17 electrically connects terminals 14 and 15 to complete the circuit, and permit electric current to flow through the heating mechanism.

In some therapeutic treatments, the procedure to be most effective involves the application of heat at the maximum temperature that the patient can comfortably stand. With the conventional procedure the attendant will wring out cloths from boiling water, and in many cases waft same in the air until it is cooled to a point where the patient can stand its application. This obviously is a very tedious, time consuming, and expensive procedure. It is also well recognized that a person's "temperature sense" varies from day to day, also it varies with his daily vitality quotient and no two persons' "temperature sense", generally speaking, are equal. To overcome the difficulties involved, as well as the inherent variable factors, a better procedure is to use a pliable electric heating mechanism without a thermostat, but supplied with a momentary contact switch to be operated by the patient or attendant. Under these conditions the patient or attendant holds the switch in his hand, and if the switch is of the type shown in Fig. 7, he depresses the push button 13 and holds it down until the maximum temperature that the patient can comfortably stand is reached, then the pressure on the push button 13 is released whereupon the compression spring 16 forces the push button 13 upwards and breaks the contact thus turning off the electric current. The pad will immediately start to cool off, and in a few moments the patient or attendant can again depress push button 13 to once more raise the temperature of the pad to the maximum point the patient can comfortably stand. This procedure is continued throughout the period that heat is to be applied. By operating in this manner, the temperature of the heating mechanism can be held relatively uniformly at low, medium, or high temperature, as is required for the particular treatment. This system further has the advantage of eliminating the danger of serious burns in case the patient went to sleep while he was applying heat, since under such conditions, the natural reaction of a sleeping person is to relax, and this is accentuated by the application of heat. When the patient relaxes under these conditions the natural tendency is for him to ease up on the pressure that he is exerting on push button 13, which will allow compression spring 16 to force the push button 13 upward and break the electrical contact. Operation in this manner therefore is one of the safest procedures to follow, and is the only one that gives a complete range of temperatures that fits each patient's immediate biologic and organic requirements.

While in Figs. 1 and 2, I have shown one way of assembling a multiplicity of sections in my improved electrical heating mechanism, there are many other ways in which the sections may be assembled, while taking advantage of the pliability obtained through this improved type of construction. Fig. 4 shows the sections mounted on a suitable back or supporting medium 18 which may, for instance, consist of cloth, canvas, burlap, open mesh material, or the like. The sections may be tied or otherwise joined thereto by means of joiners 19 at the top and bottom of each turn of the resistor element 1 which is laid in a zig zag pattern to form a section. Instead of tying it just at the upper and lower turns, each turn of the section may be tied, or sewed in place at several points by means of suitable thread 20 or the like. A somewhat different mode of assembling is shown in Fig. 6 where strips 21 are sewed or otherwise fastened at 22 to the backing material 23 to form pockets through which the heating element 1 zig zags back and forth to form sections as shown.

Still another way to make the sections is shown in Fig. 5 where hook tape is used to form the holding medium on which to string the zig zag heating element 1 to form sections. The outer strip of hook tape 24 has a single row of hooks 25, while the hook tape 26 which acts as a folding hinge between sections carries a double row of oppositely placed hooks 25. After a suitable number of sections have been assembled in this manner to form a heating mechanism of the desired size, the points 27 of the hooks 25 are bent down so that the heating element 1 is firmly held in place at each hook 25, so that it will not disengage while in use. This form of construction is one of the best to use where high temperatures are required. The heating mechanism of this type can be very rapidly assembled with corresponding reduction in cost per unit area of the heating mechanism.

In Fig. 3 a completely assembled heating mechanism is shown. One corner of the mechanism has been stripped back at both the top and bottom surface to show the heating element 1 fastened by means of a metal clip 5 to a suitable soft cord 4 or the like. The clip may be of lead or other metal, but must have a fusing point such that it will not fuse or loosen under operating conditions. Between the assembled sections of the heating mechanism and the cover 28 is preferably placed a netting 29 that is of an elastic or resilient construction. This netting 29, to obtain the most satisfactory results, should be used in unstretched condition which will increase its resiliency and elasticity. Where the heating element 1 is placed as shown in Fig. 1, so that a turn starting at the center of the top of one turn and continuing to the center of the top

of the next turn in the same section, covers an area of approximately two inches by two and a half inches, I prefer to use the standard double knotted intersection construction one half inch mesh netting 29 formed from cords having approximately a sixteenth inch diameter, as the first cover over the sections of the heating mechanism. This netting bridges over the turns of the heating element 1 in the sections so as to give a softer construction, as well as maintain the maximum amount of open air space between turns of the heater element 1, which is an aid to even distribution of heat and the carrying of relatively high temperatures. This netting, preferably of an elastic or resilient construction, which is used next to the assembled sections of the heating mechanism to aid, among other things, in producing a soft mechanism, is formed from soft cords made from cotton, hemp, jute, flax, or any of the many other materials suitable for making cords of this nature. This netting, for simplicity of understanding, may be called a netting of resilient construction, a cord netting, or a non-metallic resilient netting. The assembled heating mechanism is supplied with a switch 38, which may be of any suitable type such as the conventional single contact type, the multi-contact type, or even a momentary contact switch of the general type shown in Fig. 7.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the products herein disclosed, provided the products stated by any of the following claims or the equivalent of such stated products be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A pliable electric heating mechanism of the character described that is relatively pliable in all directions, which consists of a plurality of relatively narrow pliable sections, each section being formed from a heating element laid in a zigzag pattern and electrically connected in series to the next adjacent section, a hinge means, other than an outer cover for said heating mechanism, for joining closely together, yet in spaced relation, each pair of adjacent sections, and a means including a momentary contact switch for controlling the amount of electricity supplied to the heating mechanism.

2. In an electric heating mechanism the combination of a multi-section electric heating pad having a skeleton heating element laid in zigzag sections and fastened to a hinge member, not consisting solely of a cover for said heating mechanism, adapted to hold the adjacent edges of the sections in place, and yet prevent direct contact between the adjacent edges thereof, and a momentary contact switch.

3. In an electric heating mechanism, the combination which comprises a heating unit, an outside cover therefor, and an open mesh non-metallic elastic netting made solely from cords and placed in unstretched condition over said heating unit in manner such that it lies between said heating unit and the outside cover on all sides.

4. In an electric heating mechanism, the combination which consists of an insulated resistance wire formed into a heating unit, a suitable metal-free cloth outside cover for said heating unit, and an open mesh double knotted non-metallic resilient and elastic netting made solely from cords and placed in unstretched condition over said heating unit in manner such that it lies between said heating unit and the outside cover on all sides, whereby the heating mechanism is made softer to the touch and more even distribution of heat is facilitated.

5. A heating unit which consists of two strips of foldable tape that is a non-conductor of electricity, hooks placed on each of said strips of tape, and an insulation covered heating element laid in zigzag pattern with the turns of the zigzag heating element along one edge being engaged by the hooks on one of said strips of tape, and the turns on the other edge of said zigzag heating element being engaged by the hooks on the second of said strips of hook tape, whereby said heating element is held in zigzag pattern.

6. A pliable electric heating mechanism of the character described, which comprises a plurality of relatively narrow heating sections, each section being formed from a heating element laid in a zigzag pattern between hooks on hook tape and electrically connected to the next adjacent section, and hinge means between sections consisting of hook tape having a double row of alternating oppositely placed hooks over which the zigzagging heating element of adjacent sections is hooked before the hooks are clinched down on the heating element to hold it in place.

7. A pliable electric heating mechanism of the character described, which comprises a plurality of relatively narrow heating sections, each section being formed from a heating element laid in a zigzag pattern between hooks on hook tape and electrically connected to the next adjacent section, hinge means between sections consisting of hook tape having a double row of alternating oppositely placed hooks over which the zigzagging heating element of adjacent sections is hooked before the hooks are clinched down on the heating element to hold it in place, and means for controlling the amount of electricity supplied to the heating mechanism.

8. A pliable electric heating mechanism of the character described, which comprises a plurality of relatively narrow heating sections, each section being formed from a heating element laid in a zigzag pattern between hooks on hook tape and electrically connected to the next adjacent section, hinge means between sections consisting of hook tape having a double row of alternating oppositely placed hooks over which the zigzagging heating element of adjacent sections is hooked before the hooks are clinched down on the heating element to hold it in place, means for controlling the amount of electricity supplied to the heating mechanism, and a netting of resilient construction over the assembled heating sections.

9. A pliable electric heating mechanism of the character described that is relatively pliable in all directions, which comprises a plurality of relatively narrow pliable sections, each section being formed from a heating element laid in zigzag pattern and electrically connected in series to the next adjacent section, and a hinge means including metal clips for joining each pair of adjacent sections closely together, yet in spaced apart relation.

10. An electric heating mechanism of the character described that is pliable in all directions, which comprises a plurality of narrow sections, each section being formed from a heating element laid in a zigzag pattern and electrically connected to the next adjacent section, and a hinge means between the edges of the adjacent sec-

tions, such hinge means utilizing heavy metal clips to attach the heating element to the hinge which is so constructed that it will permit the sections to be folded one over the other to form a heating mechanism having the width of one section, but being several sections thick.

11. A pliable electric heating mechanism of the character described, which comprises a plurality of heating sections, each section being formed from a heating element laid in zigzag pattern between hooks on a suitable hook supporting material and electrically connected to the next adjacent section, and hinge means between sections, said hinge means comprising said suitable hook supporting material.

12. In an electrically operated mechanism, the combination of an electro-therapeutic mechanism, and a momentary contact switch for use in manually controlling the periods of flow of electricity through the electro-therapeutic mechanism.

13. In an electrically operated therapeutic device, the combination of a non-surgical electro-therapeutic mechanism, and a momentary contact switch for use in manually controlling the periods of flow of electricity through the non-surgical electro-therapeutic mechanism, said switch being adapted to be manually held in closed circuit position and to break such circuit as soon as holding pressure is released.

14. In a non-thermostatically controlled device, the combination of a rapid heating high wattage per unit area therapeutic electric heating mechanism, and a momentary contact switch for use in manually controlling the periods of flow of electricity through said therapeutic mechanism.

15. In a non-thermostatically controlled device, the combination of a rapid heating high wattage per unit area electro-therapeutic mechanism, and a momentary contact switch adapted for use in manually controlling the periods of flow of electricity through said therapeutic mechanism, and at the same time to perform the function of an automatic circuit breaker the instant the user either consciously or unconsciously abandons the mechanism, such automatic circuit breaking taking place without reference to time or overload and solely by the intrusion of the element of abandonment.

16. In a non-thermostatically controlled device, the combination of a rapid heating high wattage per unit area therapeutic heating pad which is non-rigid and adapted for operation at substantially any temperature within the range of the starting temperature and the maximum operating temperature thereof, and a momentary contact switch adapted for use in controlling the periods of flow of electricity through said heating pad in manner such that any operating temperature for said pad within said range may be had at will.

17. In an electric heating mechanism which you do not have to remember to turn off in the interest of safety, the combination of an electro-therapeutic mechanism having an electric resistance heating element, and a momentary contact switch for controlling the supply of electricity to the heating element and adapted to break the electric circuit as soon as circuit closing pressure on the switch is released.

18. In a pliable electric heating mechanism which you do not have to remember to turn off in the interest of safety, the combination of an insulated electric resistance element laid in suitable pattern, a cloth cover therefor, and a manually operated momentary contact switch in the electric circuit in series with said heating element, said switch having contacts, a contact maker operatively connected to a push button, and a means adapted to break the contact as soon as contact making pressure on the button is released.

19. An electric heating mechanism that is relatively pliable in all directions, which comprises a heating element formed from resistance wire laid in zigzag pattern, means for connecting said heating element to a source of electric current, a cover for said heating element, and a multiplicity of heavy metal members fastened in place at relatively uniform intervals throughout said electric heating mechanism.

20. An electric heating mechanism that is relatively pliable in all directions, which comprises a heating element formed from resistance wire laid in zigzag pattern, means for connecting said heating element to a source of electric current, a multiplicity of heavy metal members fastened in place at relatively uniform intervals throughout said electric heating mechanism, and means for holding said heavy metal members in place relative to the heating element.

21. An electric heating mechanism that is relatively pliable in all directions, which comprises a plurality of relatively narrow pliable sections, each section being formed from a heating element laid in zigzag pattern and electrically connected in series to the next adjacent section, and a hinge system which is a pliable non-conductor of electricity that forms a removable sustaining skeleton foundation for joining each pair of adjacent sections close together, yet in spaced apart relation.

22. A pliable electric heating mechanism of the character described, which comprises a plurality of relatively narrow heating sections, each section being formed from a heating element laid in a substantially zigzag pattern and electrically connected to the next adjacent section, a durable but relatively soft cable of approximately the same diameter as the heating element, means for attaching the heating element laid in zigzag pattern to the cable in manner such that said cable acts as the outer edges of each section and at the same time as the hinge between adjacent sections, and means for controlling the amount of electricity supplied to the heating mechanism.

23. A pliable electric heating mechanism of the character described, which comprises a plurality of relatively narrow heating sections, each section being formed from a heating element laid in a substantially zigzag pattern and electrically connected to the next adjacent section, a durable but relatively soft cable of approximately the same diameter as the heating element, means for attaching the heating element laid in zigzag pattern to the cable in manner such that said cable acts as the outer edges of each section and at the same time as the hinge between adjacent sections, means for controlling the amount of electricity supplied to the heating mechanism, and a netting of resilient construction over the assembled heating sections.

24. A pliable electric heating mechanism of the character described that is relatively pliable in all directions, which consists of a plurality of relatively narrow pliable sections, each section being formed from a heating element laid in a zigzag pattern and electrically connected in series to the next adjacent section, a rope-like cable between adjacent sections, means for joining the

adjacent edges of said zigzag pattern heating elements to opposite sides of said cable so that same acts as a hinge while holding the adjacent sections close together yet in spaced relation, and means including a momentary contact switch for controlling the amount of electricity supplied to the heating mechanism.

25. A pliable electric heating mechanism of the character described that is relatively pliable in all directions, which comprises a plurality of relatively narrow pliable sections, each section being formed from a heating element laid in zigzag pattern and electrically connected in series to the next adjacent section, and a relatively soft cable hinge means including metal clips for joining each pair of adjacent sections closely together, yet in spaced apart relation.

26. In an electric heating mechanism, the combination which comprises a heating unit formed from a plurality of relatively narrow heating sections, each section being formed from a heating element laid in substantially zigzag pattern and electrically connected to the next adjacent section, a durable but relatively soft cable of approximately the same diameter as the heating element, means for attaching the heating element laid in zigzag pattern to the cable in manner such that the cable acts as the outer edges of each section and at the same time as the hinge between adjacent sections, an outside cover for said heating unit, and an open mesh non-metallic elastic netting made solely from cords and placed in unstretched condition over said heating unit in manner such that it lies between said heating unit and the outside cover on all sides.

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