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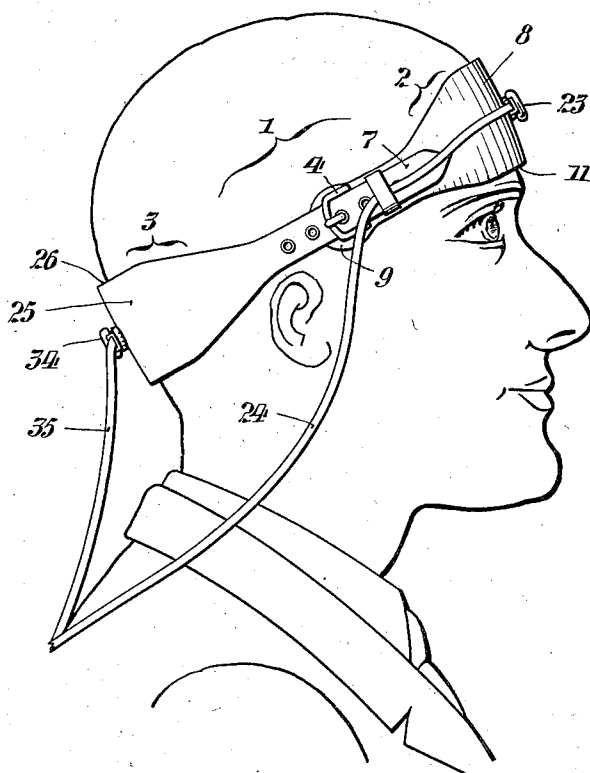
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THERAPEUTIC APPLIANCE

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2 Sheets-Sheet 2

FIG. V.



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THERAPEUTIC APPLIANCE

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13 Claims. (Cl. 128—416)

This invention relates to therapeutic appliances. More specifically, it has reference to therapeutic appliances where high frequency electric current is utilized as a curative medium as, for example, in transverse cerebral diathermy.

Broadly considered, my invention is directed toward securing more effective curative results in treatments of the kind referred to than possible of attainment with apparatus and appliances heretofore designed for the purpose, with attendant preclusion of injury to the skin of the patient at the regions where the electric current enters and leaves the part or parts of the body undergoing treatment, and with assurance of minimum discomfort to the patient.

The foregoing desiderata I realize, as hereinafter more fully disclosed, through provision of electrodes embodying multiple plate components of relatively large flat areas which have the capacity to adapt themselves readily to the contour of the part or parts of the body to which they are applied, so that the entire surfaces of said electrode components contact intimately with the skin of the patient. Obviously, under these conditions, arcing cannot take place to burn the skin, with the further advantage of a corresponding decrease in electrical resistance so that the maximum current at a prescribed voltage is permitted to pass through the tissues.

Another object of my invention is to preclude irritation of major nerves in the localities where contact is made with the skin,—for example, the supra orbital nerve incident to transverse cerebral diathermy treatments. This further desiderata I realize, also as more fully disclosed hereinafter, by so arranging the components of the multiple electrodes that the special intervals separating them correspond in position and configuration to the nerve or nerves which are to be avoided.

Still other important objects and advantages of this invention will be manifest from the detailed description following of the drawings, wherein Figs. I and II respectively are views of opposite sides of a therapeutic appliance conveniently incorporating the present improvements.

Figs. III and IV are detail sectional views on a larger scale taken as indicated respectively by the arrows III—III and IV—IV in Figs. I and II; and

Fig. V is an illustration showing how the appliance is used.

As herein delineated, my novel therapeutic appliance is in the form adapted for use in

transverse cerebral diathermy treatments and, accordingly comprises a band 1 adapted to be secured about the head of the patient. In the present instance, the band 1 consists of two straps 2 and 3 constructed of leather or other suitable flexible material, the strap 2 being fitted at its opposite ends with buckles 4 and 5, and the strap 3 formed at its opposite end with perforated tongues 6 and 7 to respectively engage said buckles. At the middle, the strap 2 has a widened portion 8, which, for a reason later on explained, is offset upwardly somewhat in respect to the longitudinal through the narrower buckle-carrying ends 9 and 10 of said strap.

Cemented or otherwise permanently attached to the inner face of the widened center portion 8 of the strap 2 is an elliptic pad 11 of relatively soft rubber or the like which is concaved somewhat both longitudinally and transversely, and which decreases in thickness from the center symmetrically toward opposite ends thereof as shown in Figs. III and IV. Cemented in turn to the exposed face of the pad 11 are four plate electrode components 12, 13, 14, and 15 of a multiple electrode which are fashioned from thin, flat springy sheet metal, such as German silver or the like, high in electric conductivity. As shown, the end electrode components 12 and 13 and the upper and lower center electrode components 14 and 15 are symmetrically disposed relative to each other and to the center of the pad 11, and together aggregate the area of the pad except for narrow outwardly-curving complementary spacing intervals 16, and a straight longitudinal connecting interval 17 which extends crosswise between said curving intervals. Imbedded in the pad 11 is a cruciform connector 18 also of pliable sheet material high in electric conductivity whereof the ends are soldered or welded fast to the backs of the plate electrode components 12—15 at the centers of the latter. The connector 18 is in turn welded or otherwise secured at its center to a terminal stud 19 which extends rearwardly through the strap 2 and which terminates in a projecting rounded head 20. Bearing against the back of the pad 11 is a relatively light flat sheet metal backing spring 21 which corresponds in configuration with the upper and lower center electrode components 14 and 15 and which is centrally secured between the strap 2 and a circumferential flange 22 on the stud 19 as shown in Figs. III and IV. The illustrated stud 19 is of the snap fastener type adapted to receive a button 23 forming the ter-

minimal of a flexible conductor cord 24 of negligible resistance, see Fig. 1.

The strap 3 also has a widened center portion 25, which, however, lies in a direct line with the strap ends 6 and 7 and the buckle supporting ends 9 and 10 of the strap 2. To the enlarged portion 25 of the strap 3 is secured a soft rubber pad 26 which is identical in size and shape with the pad 11 on the strap 2, and which moreover on its exposed face carries flat springy plate electrode components 27, 28, 29, and 30 corresponding to the electrode components 12-15 of said strap 2. Here also, a cruciform connector 31 of sheet metal with the ends of its arms soldered or welded respectively to the electrode components 27-30, is centrally engaged with a stud 32 extending rearwardly through the strap 3 and terminating in a head 33 to receive a snap button terminal 34 on a second flexible conductor 35 of negligible resistance. Similarly also, the pad 26 is backed by a vertically bowed backing spring 36 of sheet metal having a configuration and area corresponding substantially to that of the two center electrode components 29 and 30.

In use, the band 1 is secured about the head as shown in Fig. V with the pad 11 placed against the forehead, and the pad 26 against the back of the head. As the band 1 is drawn up by means of the buckles 4 and 5, the soft rubber pads 11 and 26 yield readily to compression, and thereby permit the flat springy plate electrodes to adapt themselves to the contour of the head. Incidentally, the plate springs 21 and 36 also yield to slight compression with assurance of full surface bearing of the electrode components 12-15 of the pad 11 and the electrode components 27-30 of the pad 26 upon corresponding areas of the patient's skin and hair.

With the band in place as just explained, the conductors 24 and 35 are connected to a suitable source of high frequency electric current, which current passes through the head of the patient between the multiple plate electrodes of the front and rear pads 11 and 26 respectively. Through maintenance of effective, extensive and intimate contact of the multiple plate electrodes with the skin and hair of the patient by the combined action of the resilient pads 11 and 26 and the augmentative pressure of the backing springs 21 and 36, the parts of the appliance are substantially eliminated as a resistance factor to the flow of the electric current, the only impedance to be overcome being that offered by the bones and the tissues of the head. Accordingly, the maximum flow of current at a given voltage (which may differ in degree in accordance with the constitution of the subject and the nature of the ailment which is to be cured or improved) is available for the treatment. A further advantage resulting from the efficient and extensive surface contact of the multiple electrodes is that arcing of the electric current is precluded and injury prevented to the skin of the subject by burning as often happened heretofore. As a consequence, currents at higher voltages can be employed in therapeutic treatments with perfect safety if the nature of the ailment should require it. With the multiple electrode plate components proportioned and arranged as shown, and the band 1 properly placed on the head, the outwardly curving interspaces between the center and end plates of the frontal pad will coincide in position with the supra orbital nerve which is thus protected against the in-

fluence of the electric current, with avoidance of discomfort and/or pain to the patient. The upward offsetting of the widened center portion of the strap 2 is advantageous in that it disposes the buckles 4 and the rear strap 3 to a level where a more effective hold can be maintained on the head, without however detracting from the efficiency of the contact of the frontal multiple electrode with the forehead.

The effect of the electric current is of course to heat or warm the bones and tissues through which it passes, thereby stimulating the action of the nutrient vessels and at the same time inducing increased activity in non-functioning or mal-functioning portions of the brain. The therapeutic appliance of my invention is especially advantageous in cases of internal scar tissue to promote nutrition; essential hypertension; chronic inflammation of the brain; secondary symptoms of skull fracture; as well as in the treatment of kindred ailments. It is a recognized fact that hyperemia caused by heating of the skull bones results in increased activity in the head region even in cases of brain destruction.

It is to be understood that my new therapeutic appliance is not limited to the details of construction and arrangement herein shown by way of example, since these may be considerably varied within the scope of the appended claims without departing from the spirit of my invention.

Having thus described my invention, I claim:

1. A therapeutic appliance comprising a flexible, adjustable band adapted to be secured about the portion of the body which is to be treated; a number of compressible, resilient pads secured to said band in spaced relation; plate electrodes of thin flat springy sheet metal forming the contact faces of said pads and capable, under the pressure of the pads, of conforming to the parts to which they are applied; and flexible conductors to carry electric current to said electrodes.

2. A therapeutic appliance in accordance with claim 1, including backing springs to augment the pressure of the respective pads in influencing the plate electrodes.

3. A therapeutic appliance comprising a flexible, adjustable band adapted to be secured about the portion of the body which is to be treated; a number of compressible, resilient pads secured to said band in spaced relation; a plurality of separated plate electrode components of thin, flexible sheet metal attached to the face of each pad and capable under the pressure of the pad of conformity with the parts to which they are applied; connectors electrically connecting the electrode components of the respective pads; and flexible conductors to carry electric current to said connectors.

4. A therapeutic appliance in accordance with claim 3, including backing springs to augment the pressure of the pads in influencing certain of the plate electrode components.

5. A therapeutic appliance comprising a flexible, adjustable band adapted to be secured about the portion of the body which is to be treated; a number of compressible resilient pads secured to said band in spaced relation; a plurality of separated plate electrode components of thin, flexible sheet metal attached to the face of each pad and including center components and end components respectively at opposite sides of said center components; connectors electrically

uniting the multiple plate electrode components of the respective pads; and flexible conductors to carry electric current to said connectors.

5 6. A therapeutic appliance in accordance with claim 5, including a backing spring to augment the pressure of each pad in its influence upon the center plate electrode.

7. A therapeutic appliance for use in transverse cerebral diathermy comprising a flexible, adjustable band adapted to be secured about the head; a pair of compressible, resilient pads secured to said band in spaced relation, one to bear upon the forehead and the other upon the back of the head, each of said pads having a plurality of electrode components of thin, flexible sheet metal attached to its face; connectors imbedded in the pads and electrically uniting the respective electrode components; and flexible conductors to carry high frequency electric current to said connectors.

8. A therapeutic appliance for use in transverse cerebral diathermy comprising a flexible, adjustable band adapted to be secured about the head; a pair of compressible, resilient pads secured to said band in spaced relation, one to bear upon the forehead and the other upon the back of the head, each of said pads having a plurality of electrode components of thin, flexible sheet metal attached to its face, the electrode components of the frontal pad having center and end electrodes spaced by complementary outwardly curved intervals corresponding in position and contour to the supra orbital nerve; connectors imbedded in the respective pads and electrically uniting the several associated electrode components; and flexible conductors to carry high frequency electric current to said connectors.

9. A therapeutic appliance in accordance with claim 8, including backing springs to augment the pressure of the respective pads in influencing the center electrode plates.

10. A therapeutic appliance for use in transverse cerebral diathermy comprising a flexible, adjustable band adapted to be secured about the head; a pair of compressible, resilient pads secured to said band in spaced relation, one to bear upon the forehead, and the other to bear

upon the back of the head, each of said pads having a plurality of plate electrode components of thin, flexible sheet metal attached to its face, the frontal multiple electrode having upper and lower center electrode components and end electrodes at opposite sides of said center components, the upper and lower components being spaced by a narrow horizontal interval, and the end components spaced from said center components by narrow vertical intervals corresponding in position and contour with the supra orbital nerve; connectors imbedded in the pads and electrically uniting the electrode components; and conductors to carry high frequency electric current to said connectors.

11. A therapeutic appliance in accordance with claim 10, including backing springs to augment the pressure of the respective pads in influencing the upper and lower center electrode components.

12. A therapeutic appliance for use in transverse cerebral diathermy comprising a flexible, adjustable strap band adapted to be secured about the head; a compressible resilient pad for engaging the forehead secured to said band in upwardly offset relation to the longitudinal center of the band; a similar compressible, resilient pad for engaging the head at the back, centralized on the band; a multiple plate electrode of thin flexible sheet metal attached to the face of each pad; connectors electrically uniting the plate components of each multiple electrode and imbedded in the material of the pad; and flexible conductors to carry high frequency electric current to said multiple electrodes.

13. A therapeutic appliance comprising a flexible adjustable band adapted to be secured about the portion of the body which is to be treated; a number of compressible resilient pads carried by said band in spaced relation; plate electrodes of thin flat springy sheet metal forming the contact faces of said pads and capable, under the pressure of the pads, of conforming to the parts to which they are applied; and conductors with spaced terminal connections for carrying electric current to different areas of said plate electrodes.

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