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J. D. McDONALD

3,386,445

BODY CONTACT PADS

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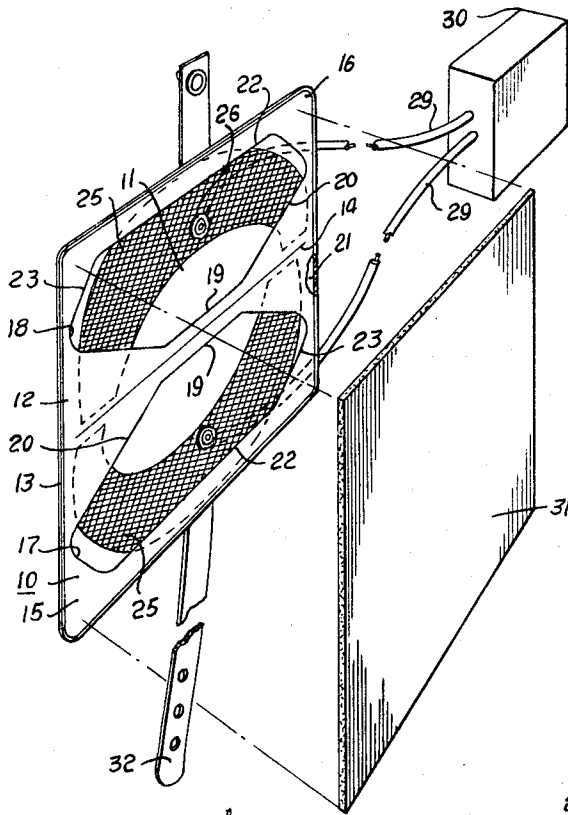


FIG. 1

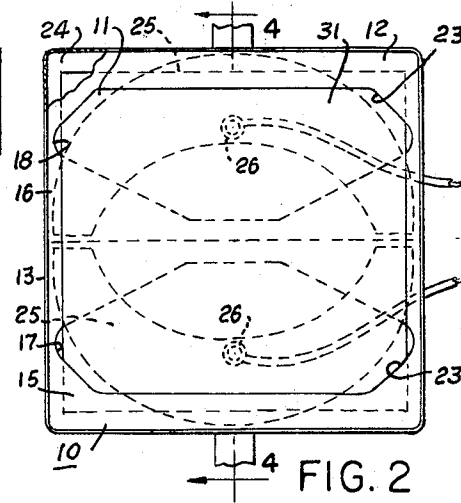


FIG. 2

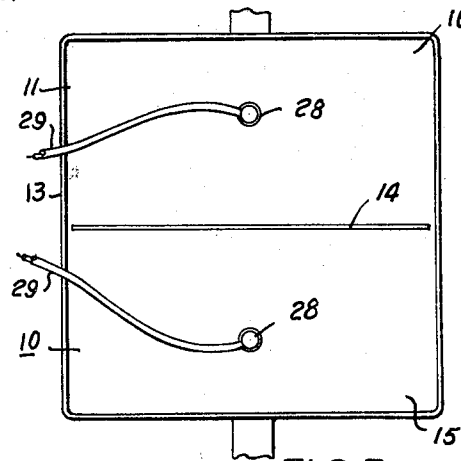


FIG. 3

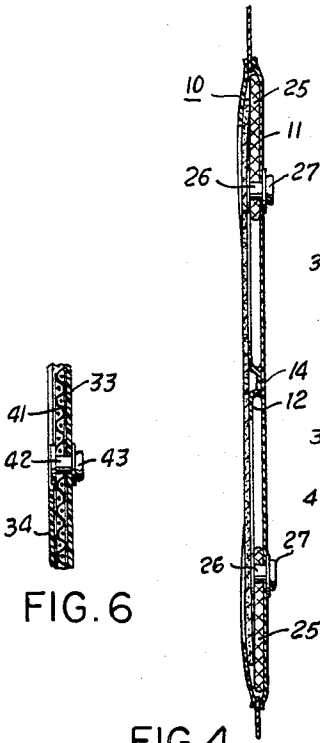


FIG. 4

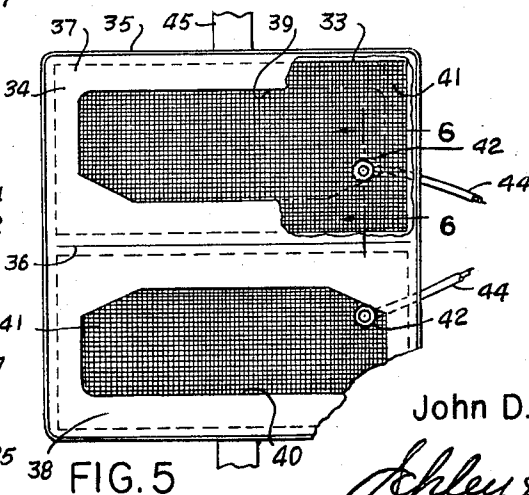


FIG. 5

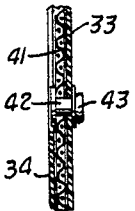


FIG. 6

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BODY CONTACT PADS

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ABSTRACT OF THE DISCLOSURE

A body contact pad for use with electronic muscle stimulating devices having a nonconductive carrier divided into two sections for isolating a pair of conductive elements whereby electrical impulses applied to one of the elements may be conducted to the other element through the human body. The conductive elements may have direct contact with the skin or with a body engaging member capable of being rendered conductive. The pad is characterized by its thinness and flexibility as well as the relatively loose confinement and large area of exposure of the elements or the member and the removability of said member.

This invention relates to new and useful improvements in body contact pads.

The invention is concerned in particular with body contact pads for engagement with selected portions of the human body and adapted to be utilized in conjunction with electronic muscle stimulating devices.

It is a principal object of the invention to provide an improved body contact pad which is of unique configuration and structure, being very simple in arrangement and economical to fabricate, yet being of marked durability and displaying enhanced effectiveness in the electronic stimulating of body muscles.

A further object of the invention is to provide an improved body contact pad having unique but very simple means for securing electrically conductive strips in position within the pad with complete protection of the user from the ends of strips which may be abrasive in nature, as well as very simple but effective means for securing to and in the pad a thin porous body contact member which is very easily inserted into position in the contact pad and readily removed therefrom.

An additional object of the invention is to provide an improved body contact pad having unique and highly effective and durable body contact means in the form of fine mesh wire cloth formed of corrosion-resistant steel which obviates the requirement for utilizing electrically conductive solutions and the like.

Other and more particular objects of the invention will be apparent from a reading of the following description.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading on the following specification and by reference to the accompanying drawing wherein examples of the invention are shown, and wherein:

FIG. 1 is an exploded view in perspective of a body contact pad constructed in accordance with this invention,

FIG. 2 is a front elevational view of the contact side of the pad,

FIG. 3 is a view in elevation of the rearward side of the pad showing the electrical connectors,

FIG. 4 is a vertical, cross-sectional view taken upon the line 4—4 of FIG. 2,

FIG. 5 is a front elevational view of a modified form of the pad, partly broken away to illustrate the structure, and

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FIG. 6 is a fragmentary, vertical, cross-sectional view taken upon the line 6—6 of FIG. 5.

In the drawings, the numeral 10 designates a carrier forming a major portion of the body contacting pad and including an approximately square, imperforate back panel 11 and a perforate front panel 12, both panels being desirably formed of very thin, flexible and electrically nonconductive material such as thin sheets of synthetic resin. The back and front panels are connected as by heat fusing or welding or in any other suitable manner about their marginal peripheries 13 and along a medial line 14 which divides the carrier into two substantially identical rectangular sections 15 and 16.

The front panel 12 is formed with each of the sections 15 and 16 having apertures 17 and 18, respectively, the apertures covering the major portion of said sections 15 and 16 and being mirror images of each other. The inner margins of the apertures adjacent the medial line 14 may have nonlinear configurations and include central portions 19 extending parallel to the medial line 14 and spaced closely thereto with the end portions 20 of the inner margins being divergent away from the medial line, thus forming triangular pockets 21 at each end of the inner margin of each of the apertures bounded by the medial line 14 and the end portions 20.

The outer margins of the apertures also have linear central sections 22 paralleling the outer margins of the carrier and being spaced closely thereto, the end portions 23 of the outer margins being convergent toward the medial line 14 and rounding smoothly into the end portions 20 of the inner margins of the apertures. Hence, additional pockets 24 are formed in the four corners of the carrier between said corners and the portions 23 of the outer margins of the apertures.

A pair of flexible, arcuate, electrical conductor strips 25 may be disposed in the carrier between the front and back panels, one of the strips 25 being exposed through each of the apertures 17 and 18 and the free ends of the strips being received in the pockets 21 so that they are prevented from coming in contact with the body of the user of the pad. Since the conductor strips are desirably formed of flat metallic braid, the free ends thereof may well include free wire ends which could be abrasive in nature and tend to scratch the user's body or at least cause discomfort if they were permitted to come in contact therewith.

The outer central portions of the conductor strips 25 are received beneath the outer margins of the front panel 12, and electrical connection with the strips is made by rivet-like, snap, electrical connectors 26 which extend through the strips 25 and the back panel 11, terminating at their back ends rearwardly of the back panel 11 in snap type connector posts 27 for receiving the snap connectors 28 of a pair of electrical conductors 29. A suitable source means 30 of electrical muscle stimulating signals supplies such signals to the conductors 29 and hence to the conductor strips 25.

For communicating the muscle stimulation signals to the user's body, a thin, flexible, porous contact pad or member 31 is provided, the member 31 being approximately square in cross-section and being adapted to have its opposite margins received in the apertures 17 and 18 and beneath the outer margins of the front panel 12, the four corners of the member 31 being received in the four corner pockets 24 of the carrier. In use, the member 31 is moistened slightly with water or other suitable electrically conductive solution, and since it is in direct contact with the conductor strips 25, the stimulating signals are thus readily conducted directly to the user's body while direct contact with the strips 25 is avoided.

It will be seen that the conductor strips 25 are very

securely positioned by this arrangement, yet this is accomplished with a very simple structure and the ensuring of the safety and comfort of the user. Further, the member 31 is easily and quickly positioned in or removed from the carrier for dampening with the conductive solution, return to the carrier and subsequent removal for washing and drying.

Any suitable type of strap means 32 may be employed for securing the body contact pad to the user's body at a desired location and, of course, the conductors 29 are quickly and easily attached to and removed from the contact posts 27.

A modified, and in some instances more desirable, form of the invention is shown in FIGS. 5 and 6 and includes a back panel 33 substantially identical to the back panel 11 together with a front panel 34 fused or otherwise attached at its margins at 35 to the back panel and also along a medial line 36 just as the panels 11 and 12 are connected. The modified form of the pad is thus divided medially into substantially identical rectangular sections 37 and 38 having therein elongate, approximately rectangular apertures 39 and 40, respectively.

A rectangular element 41 of fine mesh wire cloth, formed of corrosion-resistant steel, is received in each of the sections 37 and 38 between the front and back panels and underlying the apertures 39 and 40 so as to be exposed for direct contact with the user's body. A rivet-like, snap connector 42 extends through each of the elements 41 for the conduction of muscle stimulating signals thereto, the connectors extending rearwardly through the back panel 33 and terminating in exposed snap connector posts 43 for the reception of a pair of electrical conductors 44. In use, the rectangular elements 41 may be dampened slightly with ordinary tap water or no liquid or solution need be utilized. The modified form is also suitably positioned and secured upon the user's body by any desirable type of strap 45.

The modified form of the invention has the advantages that it is more economical in structure and eliminates the necessity of having the separate conductor strips 25 and conductor pad 31. The wire cloth makes more flexible contact with the user's body and, being specifically non-corrosive and requiring no solution, eliminates all possibilities of skin reaction by the user. The muscle stimulation signals are received over a sufficiently large area as to accomplish the desired results without discomfort to the persons using the pad, and an extremely durable, inexpensive and effective pad is thus provided. The user is protected from the raw edges of the wire cloth panels by the marginal portions of the front panels 34 surrounding the apertures 39 and 40, and the wire cloth rectangles 41 are additionally securely positioned within the carrier.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A body contact pad for use with electronic muscle stimulating devices including an electrically nonconductive carrier having a solid back panel and a front panel both of electrically nonconductive material secured to each other at their margins and along a line substantially medial of said margins, electrical connectors mounted on and extending through the back panel for engagement by electrical conductors, the front panel having a pair of apertures of relatively large area isolated from each other by the substantially medial connection of the panels and having portions extending inwardly of at least portions of the secured areas of said panels to provide pockets therebetween, and body contact means capable of being electrically conductive overlying said front panel and having at least portions of its margins confined in the pockets between said panels, the body contact means being in electrical communication with the electrical connectors.

2. A body contact pad as set forth in claim 1 wherein the body contact means includes an electrically nonconductive thin porous member removably confined with the pockets and capable of being wetted with an electrically conductive solution and flexible electrical conductor strips disposed between the front and back panels and in engagement with the electrical conductors and porous member.

3. A body contact as set forth in claim 1 wherein the front panel has portions adjacent and extending laterally of the medial line for providing pockets for confining portions of the body contact means.

4. A body contact pad as set forth in claim 1 wherein the body contact means includes a mesh wire cloth having connection with the electrical connectors.

5. A body contact pad as set forth in claim 1 wherein the body contact means consists of a mesh wire cloth having connection with the electrical connectors and exposed through the apertures of the front panel.

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