

Clamp Mounting for Electrodes.

Application filed February 14, 1921. Serial No. 444,810.

To all whom it may concern:

Be it known that I, Reinhold H. Wappler, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful improvements in Clamp Mountings for Electrodes, of which the following is a full, clear, and concise description.

My invention relates to clamp mountings for electrodes, my more particular purpose being to produce a structure carrying electrodes and having the general form of a clamp for embracing some part of the anatomy, such as an arm or a limb, the parts being so arranged that by adjusting and applying the clamp to the said part of the anatomy, the electrodes are thereby brought into engagement therewith, so as to facilitate the application of electric currents thereto.

More particularly stated, I seek to provide a structure of the kind just mentioned, so arranged that while the electrodes are held in good contact with the part of the body to which the electric currents are to be applied, the electrodes each have considerable freedom of movement and a wide range of adaptability, such, for instance, as to allow for motions of breathing, voluntary or involuntary muscular movements, nervous twitchings and the like.

My device is suitable for use with galvanic and faradic currents, currents of the kind made by shocking machines of various types, and high frequency currents of a type suitable for use in this connection.

Reference is made to the accompanying drawing forming a part of this specification, and in which like letter elements in Clamp Mountings for Electrodes are shown in several figures.

Figure 1 is a plan view of my device complete, one of the electrodes being partly shown in section.

Figure 2 is a section on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Figure 3 is an end elevation of the mechanism shown in Figure 1.

Figure 4 is a plan view of my device as it appears when applied to a part of the body, such for instance as an arm.

Figure 5 is a section showing an electrode as used with my device, but having a form different from those of the electrodes shown in Figures 1 to 4 inclusive.

Figure 6 is a fragmentary section, showing still another form of electrode, as used with my device.

A slat 5 is made of dry wood or other material suitable for the purpose, and mounted upon this slat are two arms 6, 7, also made preferably of dry wood.

Each arm is provided with two eyes 8, 9, the eyes 8 fitting slidably and neatly upon the slat 5.

Each arm is also provided with a leaf spring 10, made of metal and held in position by a binding post 11.

Each arm carries a shank 12, and is provided with a hole 13 through which the shank extends, loosely but neatly. The two shanks 12 carry a pair of electrodes, 14, 15, these electrodes being of the usual or any preferred construction and each carrying a pad 16 which may be moistened.

In Figure 4 is shown a person's arm 17, with the pair of electrodes in direct contact therewith and held in position by the clamp, consisting of the slat 5 and the arms 6, 7.

The binding posts 11 are connected with a suitable source of electric current, so that the current is sent through the anatomical part consisting, in this instance, of the arm 17.

The leaf springs 10 are always under tension while the device is in active use. Thus the electrodes 14, 15 are pressed firmly but gently against the opposite sides of the anatomical member to be acted upon by the electric currents. If the anatomical member in question is moved or distorted, the electrodes tend to move accordingly, and to follow the surfaces with which they are respectively in contact.

It will be noted that the clamp, while in active use, is quite rigid, all of the resilience and flexibility of the device being in the springs, or at least in the springs and electrodes therewith connected. This arrangement presents a distinct advantage, in that the respective electrodes are pressed and guided directly toward each other, independently of the size of the arm 17 or other anatomical member. Thus the electrodes...
may with equal facility and equal efficiency be applied to opposite sides of the thinnest portion of the wrist, the thickest portion of the ankle, the opposite sides of the head or neck, or even the skin adjacent the stomach and spine. No matter what may be the shape or thickness of the anatomical member engaged by the electrodes, the pressure of the electrode can always be rendered exactly diametrical to the anatomical member, and the pressure exerted by the electrodes may be the same if the electrodes are several inches apart as if they are in close proximity to each other.

In some instances, as indicated in Figures 5 and 6, I mount one of the electrodes in such manner as to give it additional freedom of movement relatively to the arm whereby it is supported. That is to say I sometimes provide a universal joint, so arranged as to support one of the electrodes in such manner that the axis of the electrode may be inclined to different angles relatively to the supporting arm.

In Figure 5 the supporting arm is shown at 17, and is provided with a hole through which extends a shank 18, this shank being connected with the spring 10 by a screw 19. The shank 18 is provided with a slot 20, and is fitted to receive a ball 21, so as to constitute a socket therefor. The ball 21 supports the electrode 22, which is thus mounted upon a ball and socket joint. In Figure 6 the arm 23 carries a cap 24 made of metal and resting upon this cap is a box 25.

Journalled within this box is a shaft 26, having the general form of a roller, and provided with a hole through which extends a shank 27, carrying an electrode 28.

The box 25 is further provided with a slot 29, and extending through this slot is a screw 30, which also extends through the top of the cap 24 and into the arm 23. A spring 31, corresponding to the spring 10 above described, is provided with a boss 32 which engages the box 25. By virtue of the slot 29 the box 25 has a little play relatively to the screw 30 whereby it is guided. The box 35 has a little turning movement relatively to the arm 23, upon the screw 30 considered as a swivel. Thus while the electrode 28 is pressed by the spring 31, the box 25 has two turning movements, each upon a different axis, so that the electrode 28 is supported by aid of what is essentially a universal joint.

With either of the universal joints shown respectively in Figures 5 and 6, the electrode may be applied to a surface of the body independently of how such surface is situated relatively to the surface engaged by the opposite electrode. Hence by having one of the electrodes mounted as shown in Figures 5 or 6, the pair of electrodes carried by the clamp can be fitted upon opposite sides of anatomical members of irregular formation, and which are nowhere near parallel with each other.

The operation of my device may be readily understood from the foregoing description.

The electrodes being moistened or otherwise prepared as desired, the wooden arms, are by hand moved apart, so as to bring the electrodes in position to be fitted against the diometrically opposite sides or surfaces of the anatomical member to be treated. Next the arms are by hand moved a little toward each other, so as to press the electrodes against the opposite sides of the member, as above described. This done, current is supplied by aid of the binding posts and electrical connections associated therewith, but not shown.

I do not limit myself to the precise mechanism shown, as variations may be made therefrom without departing from the spirit of my invention.

I claim—

1. The combination, with a clamp consisting of a straight slat and a pair of arms slidably mounted thereon and substantially parallel with each other, of a pair of electrodes and a pair of springs connected with said electrodes and with said arms, for the double purpose of supporting said electrodes resolutely upon said arms and of supplying electric currents to said electrodes.

2. The combination, with a pair of arms movable toward and from each other and means for supporting said arms parallel with each other, of leaf springs carried by said arms, electrodes mounted upon said leaf springs and thereby rendered resolute relative to said arms, and electrodes mounted upon said leaf springs.

3. The combination, with a pair of arms movable toward and from each other and means of supporting said arms substantially parallel with each other, of a pair of electrodes, a pair of leaf springs each supporting one of said electrodes, and a binding post connected with one spring and with each arm, for the double purpose of securing the spring to the arm and of supplying electric currents to the electrodes, through the spring.

4. A device of the character described, comprising a pair of electrodes and mechanism connected with said electrodes for the double purpose of maintaining said electrodes directly in axial alignment with each other and of rendering said electrodes adjustable relatively to each other.

5. A device of the character described, comprising a clamp provided with a pair of arms movable by hand toward and from each other, each arm being provided with a hole, an electrode carried by each arm and provided with a shank extending...
through the hole thereof, a leaf spring made of electrically conducting material and connected with each shank, and a binding post connected with each arm and with the spring connected therewith.

6. A device of the character described, comprising a clamp having arms provided with holes and adjustable relatively to each other, said holes being in axial alignment with each other, a pair of electrodes each provided with a shank extending through one of said holes, so that said electrodes are face to face and in direct axial alignment with each other at all times independently of the adjustment of said arms relatively to each other, and means for supplying electric currents to said electrodes.

7. A device of the character described, comprising a clamp having arms adjustable toward and from each other, said arms having holes so arranged as to be at all times substantially in alignment with each other, a pair of electrodes each provided with a shank extending through one of said holes, a leaf spring secured to each shank for the purpose of supplying electric currents to the electrode associated with such shank and of supporting such electrode, and a binding post connected with each leaf spring.

8. In a device of the character described, the combination of a slat, a pair of arms mounted upon said slat and so arranged as to be movable toward and from each other and yet maintained at all times parallel with each other, said arms being provided with holes, a shank extending loosely through each of said holes, an electrode mounted upon each shank, the electrodes facing each other and being maintained at all times in axial alignment with each other in consequence of the shanks extending through said holes, and means for supplying electric currents to said electrodes.

9. In a device of the character described, comprising a pair of arms, means for holding them substantially parallel with each other while allowing them to be adjusted toward and from each other, a pair of electrodes facing each other and one carried by each arm, and means for rendering said electrodes resilient relatively to said arms.

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