This invention relates to apparatus for utilizing diathermy in the treatment of the frontal and the two lateral sinuses of the human head. This treatment involves the application of sinus electrodes of the surfaces of the head nearest the sinuses, and an opposite electrode or electrodes to an opposite surface or surfaces, usually the back of the patient's neck, in such relation to the sinus electrodes that a sine wave pulsating current produced by a suitable machine will pass through the sinuses and generate heat in the intermediate tissues. The relative positions of these surfaces have heretofore rendered it difficult to conveniently locate the sinus electrodes and maintain them in the desired relative positions.

It is an accepted fact that the generation of heat within the tissues by the use of diathermy, may be localized to a considerable extent, by using at one side of the anatomy under treatment, electrodes which are smaller than those at the opposite side, the highest temperature being always nearer the smaller than the larger electrodes. Two opposed electrodes of the same size of area of contact will locate the highest temperature midway between the electrodes.

My invention has for its object to provide a diathermy apparatus for sinus treatment adapted to quickly, conveniently, and securely locate the sinus electrodes in position to conform closely to the surfaces of the face adjacent to the sinuses and to the opposite surfaces, and cause the location of highest temperature in either sinus alone, or in all the sinuses simultaneously.

I attain this and other related objects by the improvements hereinafter described and claimed.

Of the accompanying drawings forming a part of this specification,—

Figure 1 shows in perspective the three sinus electrodes and their holder, constituting an element of my improved apparatus.

Figure 2 shows the entire apparatus in elevation, as it appears in use.

Figure 3 is a front elevation of the same.

Figure 4 shows in perspective one of the larger electrodes hereinafter described.

Figure 5 is an edge view, showing the two larger electrodes shown by Figures 2 and 3, and confining means associated with the electrodes.

Figures 6 and 7 show an insulating member adapted to render either sinus electrode inoperative.

The same reference characters indicate the same parts in all of the figures.

12 designates the sinus electrode used adjacent to the frontal sinus of the human head, 13, 13 designate the sinus electrodes used adjacent to the two lateral sinuses.

I here show two opposed electrodes 14, adapted to bear on a surface opposite the surfaces on which the sinus electrodes bear, the electrodes 14 being larger than the sinus electrodes, to cause the location of highest temperature at the region of the sinuses. These electrodes are hereinafter called the larger electrodes. The sinus electrodes are mounted on a holder having a binding-post 15, for engagement with a conductor 16. The holder is preferably composed of an upper arm 17, projecting upwardly from the binding-post, and two lower arms 18, projecting laterally and inwardly from the binding-post. The sinus electrodes are provided with coupling posts or shanks 19, having sockets receiving the outer end portions of the holder arms and having set screws 20.

I provide adjustable confining means engaged with the holder and adapted to hold the sinus electrodes in their operative positions, with the frontal electrode adjacent to the frontal sinus, and the lateral electrodes adjacent to the lateral sinuses. In this instance, the confining means is embodied in a strap 23, engaged with a lug 22, on the holder and provided with a buckle 24, the strap surrounding the patient's head above the ears and pressing the holder and the sinus electrodes inwardly, so that the electrodes are held or clamped against the several surfaces on which they are intended to bear. The strap bears on the upper sides of the protruding portions of the ears and is prevented thereby from slipping downward. The electrodes are adjustable on the holder arms, to enable their location when in use to be varied, and to conform them to faces of various forms and sizes. The frontal electrode 12 may be raised and lowered by sliding its post on the upper arm 17. The lateral electrodes may be adjusted horizontally by sliding their posts on the lower arms 18, and their inclination may be varied by turning the posts on the arms. The set screws 20 maintain the electrodes in all adjustments. The arms are preferably
somewhat resilient or springy, so that they permit the contacting surfaces of the electrodes to conform closely to the surfaces on which they bear.

I provide, as an adjunct of the apparatus, insulation consisting of plates or disks 23, of hard rubber or fiber, each adapted to be interposed between a sinus electrode and the surface on which it bears when in operation, as indicated by Figure 7, thus rendering the electrode inoperative. The sinus electrodes may therefore be used selectively, either one, two, or all of the electrodes being operative. Each of the sinus electrodes is of substantially the same size, or has the same surface area as the others, and each is smaller than the opposed electrodes 14, called the larger electrodes.

There are preferably two larger electrodes 14, although only one may be used, if desired. Each electrode 14 has a binding-post 26, to engage a conductor 27. I associate with the larger electrodes, adjustable confining means adapted to hold the electrodes against the patient’s neck, in position to cooperate with the sinus electrodes in causing the passage of sine waves through the interposed tissues. In this instance, two larger electrodes 14 being employed, these electrodes are located, the one at one side of the back portion of the neck, and the other at the opposite side of said back portion, as indicated by dotted lines in Figure 3. The dotted lines in Figure 2, indicate the directions in which sine waves may pass from the sinus electrodes to the larger opposed electrodes. As above stated, one electrode 14, instead of two, may be employed, two being the preferred number.

The preferred adjustable confining means used with the electrodes 14, includes flexible straps 28, fixed to the electrodes, each electrode having a strap projecting from one of its ends, as shown by Figure 3. Each electrode has also a fastener, adapted to adjustably engage the strap projecting from the other electrode, the fastener being in this instance, a lever buckle composed of a serrated jaw portion 29, and a lever portion 30, fixed to the jaw portion, the two portions being pivoted to ears 31, fixed to and projecting outward from the electrode. The arrangement is such that the electrodes 14 may be connected by the straps and fasteners to form a neck-band adapted to be contracted about the patient’s neck, and thus hold the electrodes in operative contact with the neck surface, the electrodes 14 being variably spaced apart. The binding post, the three conducting arms and the sinus electrodes collectively constitute a tripod, of which the electrodes are the feet, these being the only parts of the tripod which touch the face. The tripod has a three-point bearing on the face and is adapted to be maintained in its operative position by the engagement of the member 22 with the strap and by the bearing of the strap on the ears.

I claim:

1. Diathermy apparatus for sinus treatment comprising a binding-post, two lower conducting arms projecting laterally in opposite directions therefrom, lateral sinus electrodes adjustable secured to the lower arms and arranged to bear on face portions at opposite sides of the nose and adjacent the lateral sinuses, an intermediate conducting arm projecting upwardly from the binding-post, between the lower arms, a frontal sinus electrode adjustable secured to the intermediate arm and arranged to bear on the forehead adjacent the frontal sinus, the binding-post, the arms, and the electrodes constituting a tripod of which the electrodes are the only members touching the face, and a head-embracing strap engaging said tripod and adapted to be contracted upon the head above the ears, and confine the tripod with the electrodes pressed against the face, the arrangement being such that when the apparatus is in use, the strap is prevented by the ears from slipping downward, and maintains the tripod with the electrodes in their operative positions relative to the sinuses.

2. Diathermy apparatus as specified by claim 1, the electrodes being provided with socketed coupling posts receiving the outer portions of the arms, and adjustable on the arms to conform the electrodes to variously formed faces, the posts having clamping screws, whereby they may be fixed to the arms to maintain various adjustments of the electrodes.

In testimony whereof I have affixed my signature.

DE FOREST B. CATLIN.