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ELECTRODE STRUCTURE
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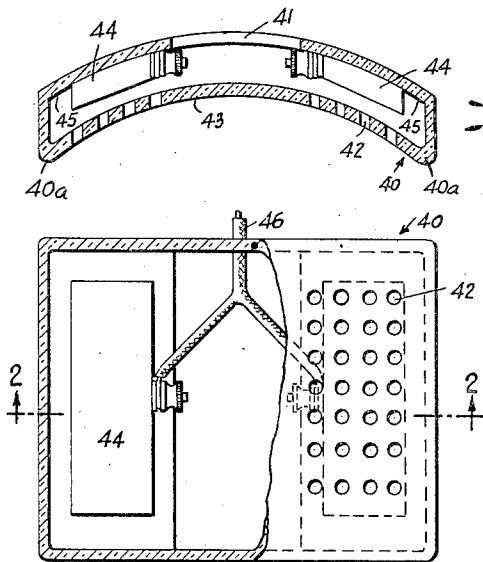


Fig. 2.

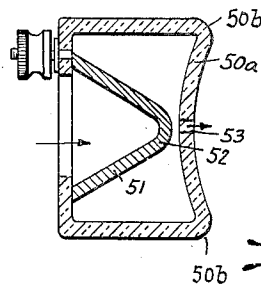


Fig. 3.

Fig. 1.

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ELECTRODE STRUCTURE

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This invention relates to improvements in electro-therapeutic baths and concerns more particularly the construction of apparatus containing one or more electrodes for use in connection with such baths.

It is a general object of the present invention to provide an efficient electrical apparatus for the treatment of various ailments affecting the human body, in which a fluid, such as a liquid or steam, is employed as a vehicle for transferring electrical charge on the ailing part of the body.

It is another object of the present invention to provide novel electrodes in combination with the aforesaid apparatus.

It is still another object of the present invention to provide a vessel or receptacle capable of housing an electrode of the aforesaid type, said vessel being made of a flexible material, if desired, and the said electrode being adjustable within said vessel, if required.

It is a further object of the present invention to provide a vessel housing the said electrode and which is adapted to permit the fluid or liquid to flow therethrough continuously, intermittently or to remain within the vessel for any desired length of time of treatment.

It is still a further object of the present invention to provide a vessel of such formation which will direct and confine the liquid flow to the body part to be treated.

Yet, another object of the present invention is to resiliently support the electrode or electrodes within a vessel, the said electrodes encompassing substantially the body part under treatment.

It is another object of the present invention to provide a massaging device in combination with an electrode, one wall of said device acting as a massaging and liquid emitting surface through which the electrically charged liquid passes to convey the electric current to the human body at the part thereof being massaged.

It is yet a further object of this invention to provide a combined liquid dispenser and massager, the said massager holding the electrically charged liquid to be dispensed through predetermined points of its surface or through its entire surface, as the case may be.

Still a further object of the present invention resides in the provision of vessel or container means made of preferably vulcanized rubber and/or sponge rubber, the latter material presenting capillary openings through which the liquid or other fluid may pass, the electrode unit

or the portions of which said electrode unit may be composed of being enclosed or housed in said sponge rubber container means, which covers up said electrode unit or its portions thus guarding the same against direct contact with the human body part, about which the container means may be placed.

These and other objects and advantages of the invention will appear from the following disclosure thereof together with the attached drawing which illustrates certain forms of embodiments thereof. These forms are shown for the purpose of illustrating the invention, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the drawing:

Fig. 1 is a front elevational view, partly broken away, of an apparatus made in accordance with this invention and containing a pair of electrodes.

Fig. 2 is a cross-sectional view taken along line 2—2 of Fig. 1.

Fig. 3 is a cross-sectional view of another embodiment of this invention.

Referring now to the drawing, Figs. 1 and 2 disclose one form of electrical apparatus made in accordance with the invention, said apparatus substantially comprising a hollow housing 40 in which a pair of electrodes 44 are arranged. Rear wall of housing 40 may be perforated, and front wall 43 is preferably provided with perforations 42, so that a fluid, such as a liquid, may flow out of the vessel 40. If rear wall 45 is perforated then the openings (similar to perforations 42) and perforations 42 will be preferably not disposed in alignment with one another so as to permit the liquid contained in or flowing through the vessel to take a more or less obstructed path through the housing 40. It will be readily apparent that a liquid flowing through housing 40 (for instance, emitted from a shower head or similar nozzle) will be charged with electricity by electrodes 44 and then transfers said electrical charge to the body part of a patient (not shown), when the patient is standing on or is otherwise in contact with a similar electrode of opposite polarity (not shown).

Figs. 1 and 2 show said housing 40 as an arcuately shaped elongated vessel or housing of preferably hard rubber or other rigid electrically non-conductive material and having an inlet or

opening 41 in its rear wall 45 and perforations 42 in its front wall 43. The electrodes 44 are spaced from one another but are preferably of the same polarity, are fixed to the inner surface of the rear wall 45 of housing 40 and are separated or spaced from said perforated front wall 43, said perforations being disposed sidewardly of said electrodes 44 and out of alignment with respect to said inlet 41. The electrodes are connected together and joined to a power source (not shown) by means of branched cable 46. Perforations 42 provided in portions of said front wall 43 are disposed opposite said electrodes 44, so that when liquid is caused to flow through opening 41 it will first be directed toward the electrode portions 44 and then diverted through perforations 42 against the patient's body. The outer rim part 40a of housing 40 is connected to the periphery of front wall 43, the junction of the front wall and rim part defining a guarding means, such that when vessel or housing structure 40 is applied to a body part a fluid containing treatment space is defined between the front wall and the body part. Since the perforated front wall portion is positioned intermediate said electrode and said guarding means, as clearly seen in Fig. 2, fluid passageways are provided from the interior of the housing 40 to said treatment space. Vessel 40 may also be flexible and adapted to fit the back of a patient, each electrode portion 44 locating over, for example, a kidney.

In this instance, housing or pad 40 may be made in the form of a pocket-shaped container having therein an inner wall of relatively stiff or vulcanized rubber material against which the electrode portions 44 may be placed, whereas the container wall opposite said electrode portions is composed of a sponge rubber material readily allowing passage of electrically charged liquid therethrough and application to any form of a human body part to be treated with said liquid.

Fig. 3 discloses a housing or vessel 50a which has a different shape than that of Figs. 1 and 2 and is equipped only with one electrode 51 having a reduced end 52. The outer rim part 50b of housing 50a forms a guarding means against which the body of a patient may be placed. Front wall of housing 50a is perforated as at 53, so that liquid from the interior of housing 50a may be discharged therefrom in a manner similar to that described with respect to Fig. 2. Electrode 51 may be connected by means of its terminal with any suitable current source.

The apparatus hereinabove described is particularly adapted for use in bath tubs, wash basins, under the shower head etc. but the apparatus may also be applied directly to the patient's body.

In the electrode structures herein disclosed provision has been made for avoiding direct or accidental contact of the human body under treatment with the electrically charged electrode or electrodes proper by disposing a guarding wall or similar means of the apparatus spaced apart from and relatively to said electrode proper, thus permitting free liquid or fluid flow along the electrode and between it and said guarding means or part with which the human body may be brought into engagement without any dangerous effect thereto. The material employed for the electrode structures disclosed hereinabove can be copper, zinc, carbon or similar electric current conducting material or suitable composition thereof. In these electrode

structures it is preferable to construct the same so as to accomplish, if possible, a uniform transfer of electric current charge to the fluid or liquid surrounding or contacting the electrode or electrodes proper during its flow through or when contained in the apparatus housing. The electrode may also be removably disposed within said housing, so as to facilitate cleaning of the electrode and the housing. Furthermore, the electrode or housing may be equipped with an electric heater of known construction (not shown) to regulate the temperature of the bath liquid contained in the apparatus housing. The material employed for the housing may be translucent or transparent and must have electric insulating properties, such as, cellulosic, resinous or organic plastic material or compositions thereof. A translucent housing permits treatment of the body part also by light rays, which may come from any suitable electric light source (not shown), the latter being placed within or without said housing.

It is common to all apparatus above referred to and described that their construction is such that the liquid contained in or passing through the apparatus (which liquid forms the vehicle of the electrical charge) may freely flow between the portion of the apparatus guarding against direct contact of the electrode with the part of the body under treatment and the electrode itself, whereby at least one of the faces of the electrode is completely and effectively exposed and can thus be used to convey electric current to the liquid. In all examples hereinabove set forth the electrode or electrodes within the apparatus shown are disposed in spaced relation to the guarding portion of the apparatus so that it is possible that a patient to be treated may lie upon or may be supported by the particular electrode structure. It is well understood that the electrode structures herein contemplated may be used in connection with any bath type adapted to produce either a full bath for the entire body or a partial bath, such as baths for foot, hand or other part of the human body to which the electrode structure may be conformed or disposed in predetermined relation.

It is also understood that in the apparatus herein disclosed the electrode is to be considered encased in a stationary liquid bath provided and self-contained within the apparatus or placed in a flow of bath liquid, which passes from one end to another end of the apparatus. In these cases the apparatus with the electrode or electrodes housed therein may also be used outside of a bath tub or similar bath container; however, an electrode of opposite polarity must always be held in engagement with any other body part to establish electric current flow through the body part and that under treatment unless the housing contains two electrodes (Figs. 1 and 2) to which electric current may be supplied presenting different polarities at said electrodes, respectively.

From the above description it will be apparent that the devices of the above nature possess the particular features and advantages before enumerated as desirable, but which obviously are susceptible of modification in their forms, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of their advantages.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to the above embodiments, it will be understood that various omis-

sions, substitutions or changes in the forms and details of the devices illustrated and their operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent, is:

1. An electrode structure of the character described comprising a rigid elongated housing having front and rear walls made of electrically non-conductive material, said front wall being provided with a perforated portion, a rim part of said housing connected to the front wall at its periphery, the junction of the front wall and rim part defining guarding means such that, when the housing is applied to a body part to be treated a fluid containing treatment space is defined between the front wall and the body part, at least one electrode arranged for position adjacent said rear wall of said housing and separated from said perforated front wall, said perforated front wall portion being disposed opposite said electrode and intermediate said electrode and said guarding means thereby providing fluid passageways from the interior of the housing to said treatment space, said electrode extending nearer to said perforated front wall portion than to said guarding means, and a fluid inlet disposed sidewardly of said electrode and out of alignment with respect to said perforations in said front wall portion, thereby adapted to provide a fluid filled housing with self-contained electrode.

2. An electrode structure of the character described comprising a substantially rigid elongated housing having front and rear walls made of electrically non-conductive material, said front wall being provided with a rim part and a perforated portion connected to said rim part, the junction of the front wall and rim part defining guarding means such that, when the housing is applied to a body part to be treated a fluid containing treatment space is defined between the front wall and the body part, an electrode arranged for position in said housing and spaced

from said perforated portion of said front wall, said perforated front wall portion being disposed opposite said electrode and intermediate said electrode and said guarding means, thereby providing fluid passageways from the interior of the housing to said treatment space, said electrode being adapted for connection with an electric current supply source and extending nearer to said perforated front wall portion than to said guarding means, and a fluid inlet passing through the rear wall of said housing, thereby adapted to provide a housing with self-contained electrode in contact with said fluid when the latter is supplied to said housing.

3. An electrode structure of the character described comprising a substantially rigid elongated housing having front and rear walls made of electrically non-conductive material, said front wall including spaced perforated portions, said housing being provided with a rim part connected to said front wall at its periphery, the junction of the front wall and rim part defining guarding means such that, when the housing is applied to a body part to be treated a fluid containing treatment space is defined between the front wall and the body part, two electrodes arranged for position in said housing and spaced from said perforated portions of said front wall, said perforated front wall portions being disposed opposite said electrodes, respectively, and intermediate said electrodes and said guarding means, thereby providing fluid passageways from the interior of the housing to said treatment space, said electrodes being adapted for connection with a supply source of electric current providing opposite polarities at said electrodes, respectively, and extending nearer to said perforated front wall portions than to said guarding means, and a fluid inlet passing through one of the walls of said housing, thereby adapted to provide a housing with self-contained electrodes in contact with said fluid when the latter is supplied to said housing.

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