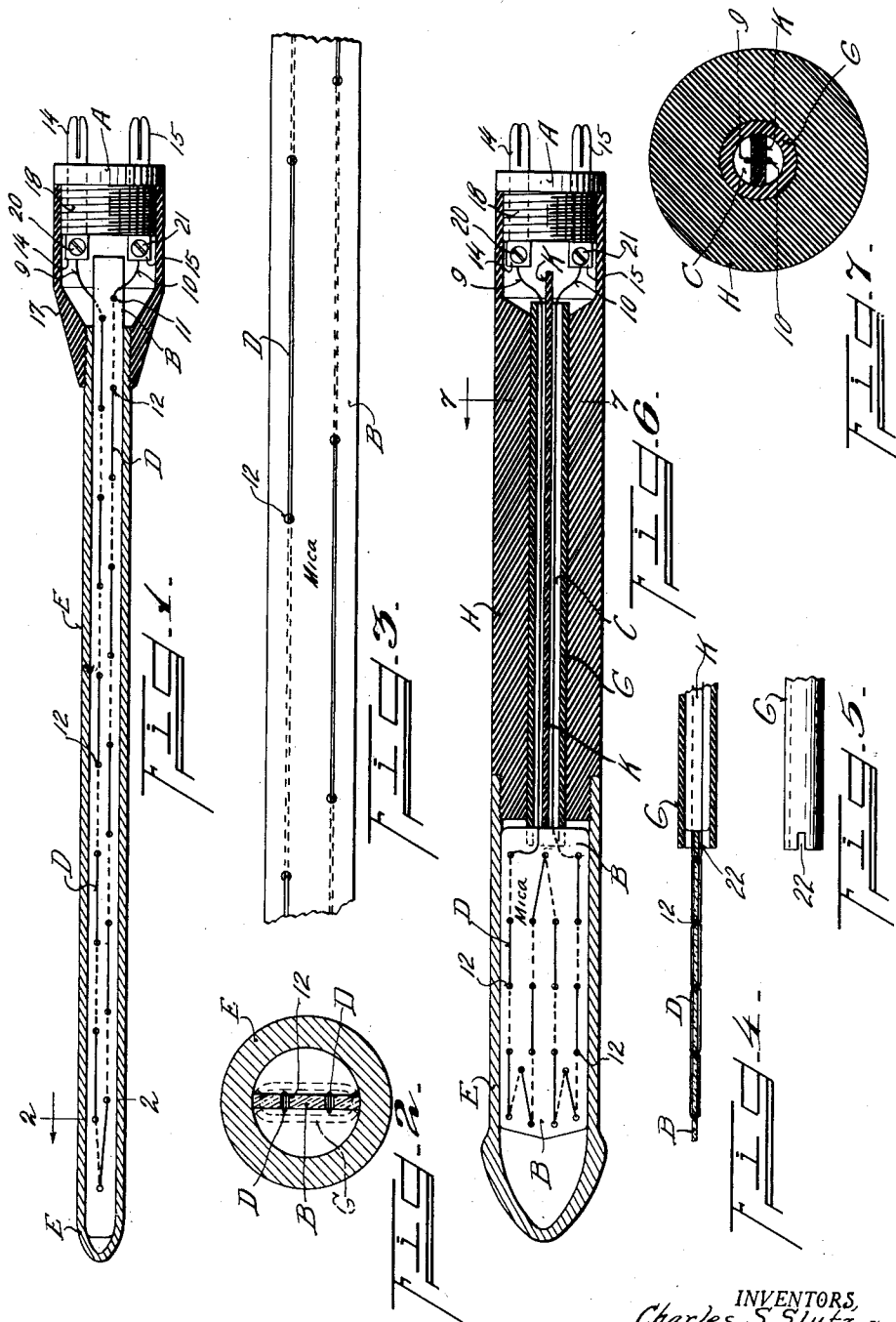


Oct. 12, 1937.

C. S. SLUTZ ET AL
ELECTRICAL THERAPEUTIC APPLIANCE

2,095,678

Filed April 28, 1934



INVENTORS,
Charles S. Slutz,
Herman Kelleff,
BY *Raymond J. Kelly*
ATTORNEY

UNITED STATES PATENT OFFICE

2,095,678

ELECTRICAL THERAPEUTIC APPLIANCE

Charles S. Slutz and Herman Kellett,
Los Angeles, Calif.

Application April 28, 1934, Serial No. 722,946

1 Claim. (Cl. 219—21)

This invention relates to improvements in thermal therapeutic devices and more especially to the heating elements thereof.

Among the objects of this invention are: To provide an internally heated therapeutic device of very small cross section for such beneficial effects as high temperatures can produce when introduced into the human or other living body, and to provide a reliable electric heating unit adapted for enclosure within such small dimensions; to provide a novel form of electric heating unit adapted for any purpose, especially in a constricted space; to provide a complete structure, including such therapeutic appliance with heating arrangement and having suitable insulated passages for conducting wires leading to the heat unit.

Other objects will appear as this description proceeds.

We are aware that appliances of somewhat similar form and intended to fulfill the same purposes have been devised and that, broadly, the general idea of introduction of heat into the human body for certain therapeutic reactions is not, per se, novel. But all such devices known to us have certain unsatisfactory features, proceeding principally from attempts to use well-known forms of electrical heating units, inside very small tubes or containers, which types of heating units are not adapted for such reduction in size compared with the quantity of heat required for the purposes indicated. Our form of heat unit and the instrument produced by its use are novel so far as now known to us.

With the foregoing and other objects in view, the invention consists in the novel and useful formation, construction, interrelation, and combination of parts, members and features, as well as mode and methods of use thereof, and steps and performances taken and had, all as herein-after described, shown in the drawing and finally pointed out in the claim.

In the drawing:

Fig. 1 is a longitudinal section through one form of the instrument, completely assembled, showing the general form of the heat unit.

Fig. 2 is a cross-section thereof on line 2—2 of Fig. 1 drawn to a greatly increased scale.

Fig. 3 is a greatly enlarged fragmentary detail of the heating element, showing a side elevation.

Fig. 4 is a sectional edge view of a heat element, supported at one end by a tubular member.

Fig. 5 is a fragmentary detail of the tubular support.

Fig. 6 is a longitudinal section of a second

form of the instrument completely assembled and with the heat unit in position.

Fig. 7 is a cross-section thereof drawn to a greatly enlarged scale.

In general, it will be observed that the instrument is for insertion within the body, or a member thereof, and while in position the temperature is raised to such a degree as may be desired for such therapeutic effects as devices of this character are intended to produce. While the temperature may be controlled up to some maximum value, no control devices are shown, as they form no part of this invention.

Fig. 1 shows a slender metal tube E closed at one end, the other end being attached to a hollow member 17 which has an increasing diameter. An insulating member A closes the larger diameter end of member 17. Contact or socket members 14 and 15 extend through member A, spaced apart and projecting from both ends of member A as shown. The heating element extends throughout the length of the metallic tube E and a distance into member 17 less than the length of the open space in this latter member. This element comprises a flat strip B of insulating and heat resisting material, as mica, having a plurality of longitudinal rows of spaced holes 12 through it, through which heating wire D is laced back and forth as shown in the various figures. The heat unit shown in Figs. 1 and 3 has two rows of spaced holes 12. Heating wire D begins near the inner end, wire 9 joining S to terminal 14, being attached thereto by screw 20. This wire D passes from the rear of member B through the first hole 12 to the front side of member B, then is stretched to lie flat against the front face of member B until the wire reaches the next succeeding hole 12, through which it passes to the rear of member B and is then drawn taut against the rear side of the flat strip B until the next hole 12 is reached, through which the wire D passes back to the front face of the strip B, and so on, until the last hole of the row is reached. After passing through it, the wire passes through the end hole common to both rows of holes, then through the end hole of the next row, and is similarly laced back to the starting end of the lacing, the end of the wire D being connected to wire 10, attached by screw 21 to terminal 15. An edgewise view of this laced wire heating unit is indicated in Fig. 4 with a shorter strip B.

The strip B has a width such that it must be forced or pushed into the tube E, and is held in position by friction against the walls of tube E.

Since the strip B must take a diametral position across the tube E as shown in Fig. 2, it is impossible for the member B to move facially in either direction toward the tube wall and, except by accident, as breakage of a section of the heating wire D, lying between adjacent holes 12, the wire can never touch the tube wall.

If desired, as a precaution, the heat unit may be enclosed in some heat resisting, insulating material as indicated by dotted lines G, Fig. 2.

The form of appliance, shown in Figs. 6 and 7, uses the same form of heater as described except that its width is greater to fit into the larger diameter of tube E shown. This unit, therefore, has a greater number of rows of holes than that used in the smaller diameter device, as indicated. As before described, the heating wire D connects with wire 9 fastened to terminal 14 by screw 20, and passes through a comparatively long bore in member H, at one end whereof metal tube E is attached. The length of heated tube is shorter than that shown in Fig. 1 and the heating element has a corresponding length. The insulating strip, through which the heating wire is laced, fits diametrically across the tube E and requires some appropriate force to make it enter the tube. As before explained, it cannot move facially toward the wall of the tube E as it cannot occupy any position in the tube except diametral. However, as a secondary holding means, the tube G of insulating material, extends through the bore of tubular member H and projects beyond from the outer end of H. A diametral pair of slots 22 is formed in the outwardly projecting end of tube G, which accommodates one end of the flat member B and thus provides an end support for member B.

Connecting wire 9 leads to one end of heating wire D, and wire 10 leads to the opposite end of wire D, these two wires passing through tube G. A flat strip K of non-conducting material lies between wires 9 and 10 and extends through tube G and projects a considerable distance into the inner space hollowed out of the entry end of member H, which is bored to receive plug A through which terminals 14 and 15 pass. Metal tube E is attached to member H, which may be of any desired substance, as metal, hard rubber, fibre, or other suitable material. If member H is an insulating material, insulating tube G is omitted, supporting slot 22 being made in the end of the separating strip K and being identical with the slot shown in Figs. 4 and 5, into which, the neighboring end of the member B is tightly fitted. The details of the appliance shown in

Fig. 6 are obvious from the above description and the drawing.

It will be observed that the heating wire of the heating element herein disclosed is securely anchored by passing through holes or lacing, and that by fixing the distance between consecutive holes at some comparatively short distance, the change in length of any element between two holes can never be sufficient to permit appreciable divergence of the wire from a straight line between successive holes. Also, by "lacing" the wire through holes in the supporting member, each point of support is fixed reliably and does not depend on anchoring with added parts or members, so that in no manner can the heat wire become loose and the expansion from point to point is negligible.

Having described our invention in connection with illustrative embodiments, forms, proportions and arrangement of parts, it will be understood that many variants thereof are possible to those skilled in the art, and our invention, in its broader aspects, is not limited to the specific construction herein described and shown, as changes in the sizes, proportions, configurations, arrangements, assemblage, interaction, juxtaposition and mechanical relations, as well as additions, omissions, substitutions, combinations and alterations of forms, parts, members and features, may be made without departing from the broad spirit of this invention.

Having thus described our invention, we claim and desire to secure by Letters Patent:

A therapeutic device adapted for introduction into and imparting heat to the interior of the body, comprising a hollow metal heat-imparting portion, a heater means therein, a non-conducting elongation of said metal heating portion for manipulation of and for increasing the depth of insertion of the heating portion beyond the length thereof, said heating means comprising an electrical resistance mounted on a comparatively thin supporting member, the dimensions whereof are limited within the hollow space of said heat-imparting portion, a sleeve passing axially through said non-conducting elongation member, and wires passing through said sleeve to, and connecting with, the heater means, and means for mounting said heating means within said heat imparting portion comprising an axial extension of said sleeve beyond length of said non-conducting portion and providing diametral notches in said sleeve extension to receive an end of said thin support.

CHARLES S. SLUTZ.
HERMAN KELLETT.