Aug. 30, 1932. A. POT 1,875,261

APPARATUS FOR APPLYING HEAT FOR THERAPEUTIC AND OTHER PURPOSES

Filed Feb. 10, 1928 2 Sheets-Sheet 1

Fig. 1.

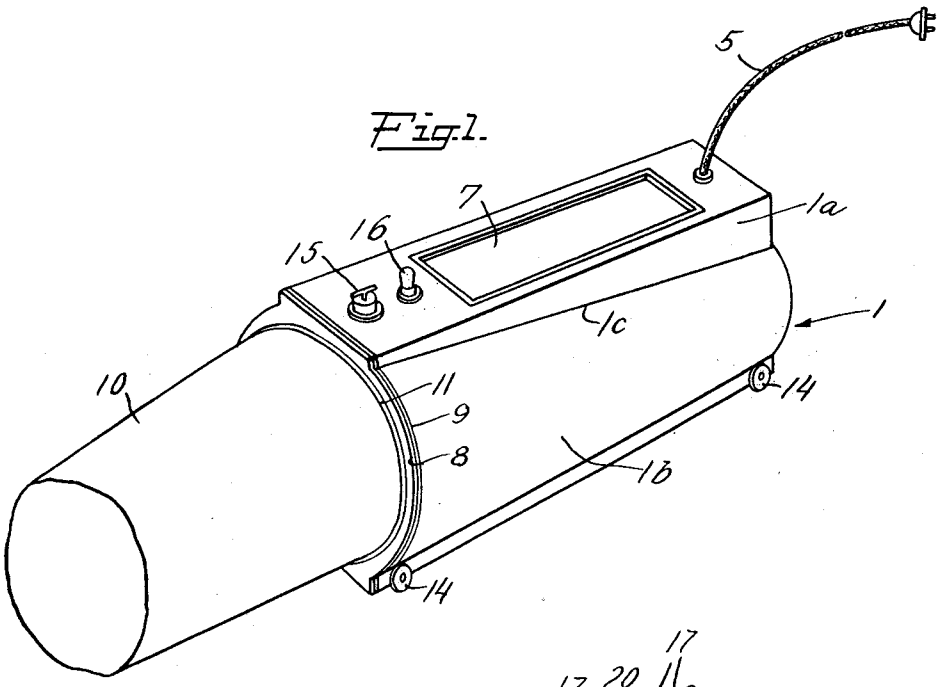

Fig. 2.

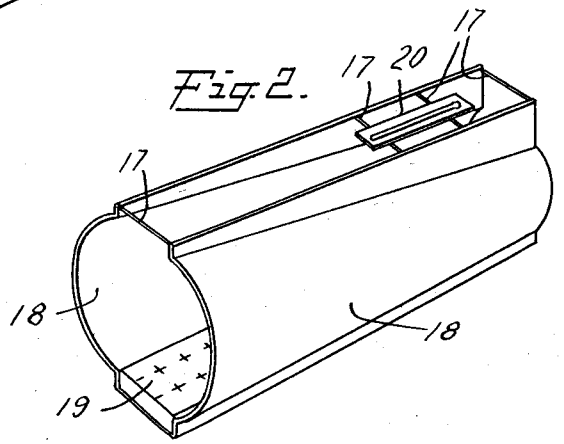

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Fig. 3.

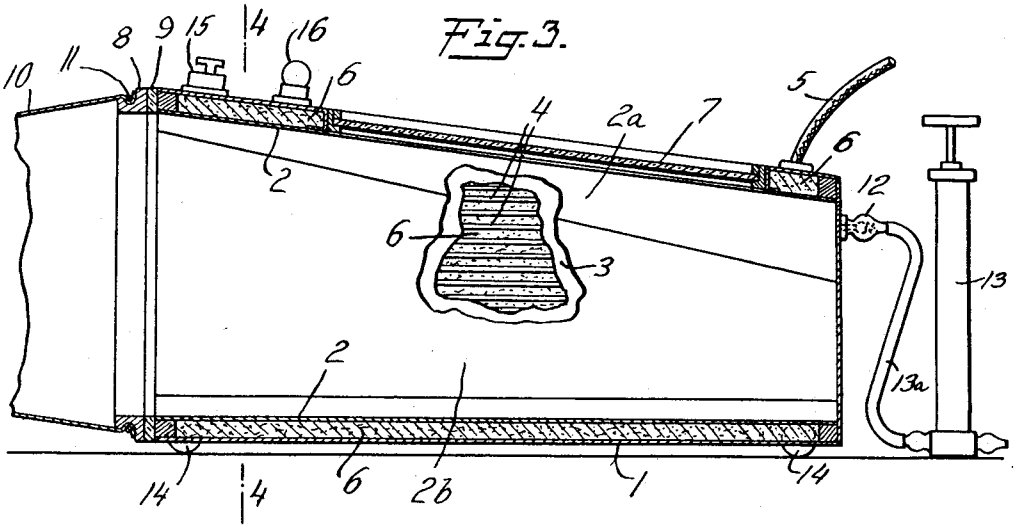


Fig. 4.

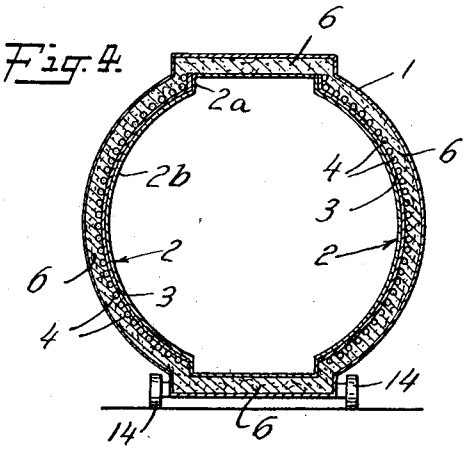
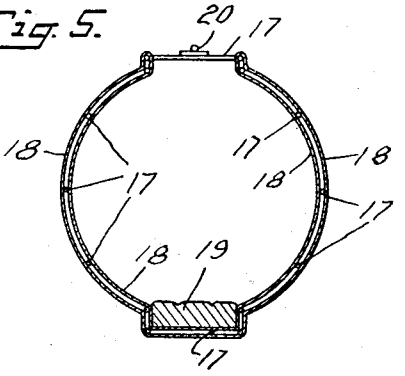


Fig. 5.



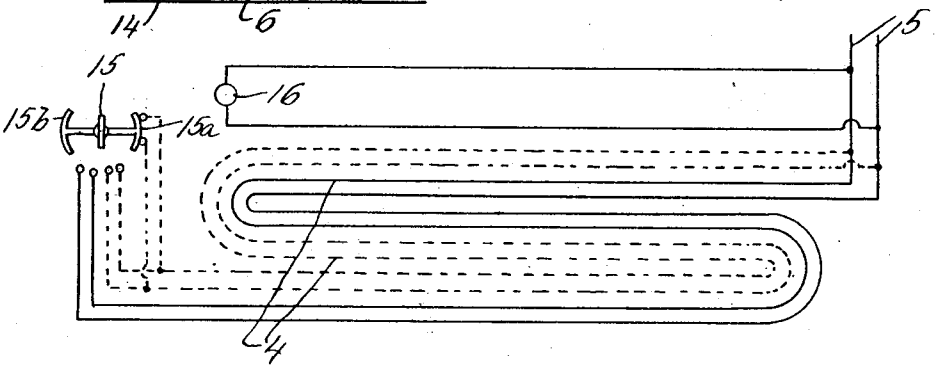


Fig. 6.

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Patented Aug. 30, 1932

1,875,261

UNITED STATES PATENT OFFICE

ARTHUR POT, OF NEW YORK, N. Y., ASSIGNOR OF FORTY-NINE ONE-HUNDREDTHS TO WILLIAM S. JENNINGS, OF NEW YORK, N. Y., AND FIFTY-ONE ONE-HUNDREDTHS TO HENRY JAMES LEVELL, OF MOUNT VERNON, NEW YORK

APPARATUS FOR APPLYING HEAT FOR THERAPEUTIC AND OTHER PURPOSES

Application filed February 10, 1928. Serial No. 253,291.

My present invention relates to an improved apparatus for the generation and application of heat for therapeutic and other purposes. The form of the apparatus shown is primarily intended for the generation and application of heat for therapeutic purposes such as for baking the arms and legs or parts of the body for the cure of arthritis and other ailments but, of course, the invention in its broader aspect is not limited to this particular form or use of the apparatus.

Whereas a heat of 130 or 140 degrees Fahrenheit in the usual therapeutic heat treatment apparatus is liable to burn the patient, a far higher temperature, such as 220 degrees Fahrenheit, can be used in my present apparatus with entire safety to the patient and with far more rapid and extraordinary therapeutic effects due to the safe use of the higher temperatures. Indeed, temperatures as high as 275 degrees Fahrenheit have been safely used with my apparatus. As will be explained later, this is doubtless due to the substantial elimination of the irritating or burning heat waves brought about by the means used for generating and modifying the heat in my apparatus.

In the usual therapeutic heat-treating apparatus, the flesh must be bandaged to protect it from the direct action of the heat; and any sweating that occurs from any of the exposed parts leads to burning. Despite the much higher temperatures usable with my apparatus, the flesh need not be bandaged and there is no burning even if there be profuse sweating.

Since profuse sweating is desirable in the heat treatment of most ailments, it will be evident that my apparatus has the great advantage that there can be profuse sweating without leading to burning.

If the part during the heat treatment by my apparatus does not sweat at all or insufficiently, I have discovered that I can artificially induce a satisfactory sweating of the parts by applying suction to the heating chamber for a suitable time interval sufficient to accomplish the result.

Furthermore, the shape and constructive features and details of my apparatus are important, as will hereinafter appear or will be evident to those skilled in the art from the following description in connection with the drawings.

In the drawings, Fig. 1 is a perspective view of my apparatus in a preferred form adapted especially for therapeutic treatment of the legs and arms; Fig. 2 is a perspective view of the fabric-covered frame which is removably insertable into the apparatus shown in Fig. 1 through its large end; Fig. 3 is a longitudinal vertical section through the apparatus shown in Fig. 1, also showing in elevation the suction pump and connections for reducing the air pressure within the heating apparatus; Fig. 4 is a transverse section, partly in elevation, on the line 4—4 in Fig. 3; Fig. 5 is a transverse section through the fabric-covered frame of Fig. 2; and Fig. 6 is a diagram of the electrical circuits of the heating system.

Describing now my invention by way of the devices illustrated in the drawings,—1 is a container made preferably of sheet iron, having the general shape shown in Fig. 1 and perhaps best described as consisting in its preferred form of an elongated rectangular box-like portion 1^a on top of an elongated cross-sectionally-tapering main portion 1^b. The two side-lines on which said top and main portions 1^a and 1^b are joined are designated 1^c; and it will be understood that said top and main portions 1^a and 1^b freely connect with each other interiorly without any septum or partition between them.

2 is a metallic chamber made of copper or some other metal or material having the heat-conducting and heat-modifying properties of copper. This metallic chamber has the same general shape as the container 1 but smaller so as to fit inside said container with about a one inch space all around between them. The container 1 of the particular apparatus from which the drawings were made is 34″ long, 17″ high at the large end, and 13″ high at the small end. For practical purposes I at present prefer to make the chamber 2 in the apparatus shown of sheet copper 18 B & S gauge.

The aforesaid space between the container 1 and chamber 2 houses the following ele-

ments all external to or outside of the copper chamber 2:—3 is a layer of thin mica immediately adjacent the sides of said copper chamber 2 within said space. Adjacent said mica layer is the heating means consisting preferably of asbestos covered electrical resistance wires 4 preferably made of No. 28 B. & S gauge Ni-chrome resistance wire. The electric light wires 5 (compare Figs. 3 and 6) preferably controlled by a switch (not shown) come through the top of the apparatus and connect with the aforesaid resistance wires 4. These latter extend in said space horizontally back and forth as indicated diagrammatically in Fig. 6 from near one end of the apparatus to near the other end adjacent the thin mica layer covering the sides of the top and main portions 2^a and 2^b of the copper heating chamber 2. Preferably, as shown in Fig. 4, there are no heating wires applied to either the top or the bottom of the heating chamber. Filling the remainder of the aforesaid one inch space between the copper heating chamber and the sheet iron container at the sides, top and bottom are layers of asbestos 6.

At the top of the apparaus a rectangular opening is formed through both the container 1 and the copper chamber 2, in which opening is framed a glass pane 7 which preferably seals the opening substantially air-tight so far especially as sealing the heating chamber 2 is concerned.

It will be understood that the small end of the container 1 and of the copper chamber 2 is in each instance sealed or closed by being provided with an end wall or closure. On the other hand, the large end of each is open to permit the insertion therethrough of the part or article to be treated. Also, it will be understood that the chamber 2 is preferably secured permanently within the container 1 as described.

8 (Fig. 3) is a wooden frame secured in any suitable manner to the mouth of said open end of the apparatus, and 9 is an intermediate rubber gasket. 10 is a sleeve of flexible air-tight rubberized or equivalent fabric surrounding and secured at one end to the aforesaid wooden frame by a cord or wire 11 located in a groove in said frame and serving to tie said sleeve substantially air-tight to the frame and the mouth of the copper heating chamber.

12 (Fig. 3) is a nipple leading through the closed end of the container 1 and having an air-tight connection with the heating chamber 2. By means of this nipple the hose pipe 13^a of the hand-operated suction pump 13 is properly connected to exhaust the air when needed from the interior of the heating chamber 2. The latter, it will be understood, is made with air-tight seams. Also, as already indicated, due precaution is taken to prevent any air leaks into said chamber via the window construction 7. The result is that when the patient's arm or leg is inserted into the copper heating chamber 2 through the rubber sleeve, and when said sleeve has been bound about the member, a suitable vacuum can be quickly created within said chamber by operating the hand pump 13.

The entire apparatus may be conveniently supported, as shown, on four wheels 14 so as to be readily movable along a table or platform to apply or remove it from the part being treated.

The particular heating means 4 shown diagrammatically in Fig. 6 comprises two units, one unit indicated by the dotted lines 4 and the other unit by the full lines 4. A controlling switch 15 is provided so that for a reduced heat only one unit need be operated, whereas for higher heat both units may be operated simultaneously. For simplicity, the diagram (Fig. 6) shows only one circuit of electrical heating resistance wire 4 in each heating unit connected across the electric light wires 5. As a matter of fact, in the actual apparatus illustrated in the drawings, there are seven circuits of electrical heating resistance wires 4 in each heating unit connected in multiple across the electric light wires 5.

The above referred to heat controller is a switch 15 having a rotatable member provided with two metal arcuate parts 15^a and 15^b. When in the position shown in Fig. 6 only the shorter part 15^a completes the circuit of only one of the heating units, namely, the one indicated by the dotted lines 4. Obviously, by virtue of the wire shown in Fig. 6, both the dotted and full line circuits 4 will be thrown into operation when the switch member is rotated 90 degrees in anti-clockwise direction, whereby the longer part 15^b will be caused to bridge across and electrically complete both the dotted and the full line heating circuits 4.

The apparatus is such that a temperature of about 270 degrees Fahrenheit is procurable in the copper heating chamber 2 by applying 650 watts to the heating means 4. Either alternate or direct current may be used.

16 is a pilot lamp connected across the electric light wires 5 (Fig. 6) to indicate to the operator whether or not the current is on in the apparatus.

Finally, I provide means for comfortably supporting and at the same time keeping the part being treated out of direct contact with the copper chamber 2 consisting preferably of a hollow wire frame 17 covered with fabric 18. Also, the bottom of the frame supports a cushion 19 for comfortably supporting the part. The fabric, of course, completely covers the frame so that only the fabric comes in contact with the patient. The frame has the general shape of the copper chamber 2 but sufficiently smaller so as to be readily insertable and removable therefrom for the purpose of changing the fabric when soiled.

With the apparatus constructed as indicated, temperatures ranging from 200 degrees or lower to 270 degrees Fahrenheit and even higher are obtainable inside the copper chamber 2. A thermometer 20 (Fig. 2) supported on top of the fabric-covered frame, viewable through the window 7, shows the temperature at any given moment, and this temperature in turn can be controlled by suitably operating either the switch 15 or the other switch (not shown) by which the electric heating resistance wires 4 are connected with the electric light wires 5.

The reason why my present invention makes possible the use of so much higher temperatures than the usual heat treatment apparatus without burning effects is due to a number of considerations. Among these is the method of generating and transmitting the heat from the heating source. Also, the shape of the heating chamber, etc.

Thus, the heating means heats the part, article or substance within the apparatus not directly but only indirectly after the heat from the source 4 or other suitable substitute heating means has passed into the copper shield constituting the walls of the chamber 2 and is then radiated therefrom to heat the contents of the said chamber. During this passage of the heat through said copper shield, the burning heat rays become transformed into non-burning rays. I claim as equivalents of copper in connection with my invention for said indirect source of heat for heating the chamber of my apparatus, or in connection with my process, any other metal or material having substantially the ability of copper to transmit the heat from the initial source with substantial elimination of burning action therefrom.

The tapering cross-sectional shape of the heating chamber 2, including the use of the heretofore described top portion 2^a of said chamber works against any tendency to burn the part being heat-treated within the chamber. The same can also be said of applying the heating means to the sides only of the chamber as distinguished from its top and bottom. The foot, especially the heel, and the shin portions of the legs are especially sensitive to heat treatment and the foregoing helps in this regard.

The thin layer of mica 3 prevents the electrical heating resistance wires 4 from becoming short circuited by the copper chamber 2 in case defects develop in the asbestos insulation of said wires; but whether the mica has any transforming action on the heat like the copper wall of said chamber, I have not as yet ascertained, but that is possible.

The asbestos 6 keeps in the heat and vice versa prevents loss of heat to the outside of the apparatus.

To practise my invention, the electric current is turned on to the wires 5 and the switch 15 is adjusted to energize either one or both of the heating units, depending on the degree of heat desired for the particular purpose in hand. When the thermometer shows that the desired heat has been attained in the chamber 2, the part to be treated, such as the arm, is inserted into said chamber through the rubber sleeve, which latter is then wrapped snugly about the arm. The duration of the treatment may be fifteen or twenty minutes or longer depending upon the effect to be accomplished. The part can be watched through the window 7. In case the part does not sweat or in case more profuse sweating is wanted, the operator uses the suction pump 13 to more or less evacuate the fluidic contents or atmosphere of the heating chamber 2 which I find opens the pores and starts profuse sweating. Usually holding the vacuum in the heating chamber for a few minutes is sufficient for this purpose, whereupon it may be released.

What I claim is:

1. Therapeutic heating apparatus comprising the combination of a metallic chamber for receiving within it the part to be treated and made of a metal such as copper; insulated electrical resistance heating wiring applied exteriorly to the sides of said metallic chamber as distinguished from its top and bottom; and a heat-confining container enclosing all of the foregoing; removable means within said metallic chamber for receiving into it the part to be treated to prevent direct contact between said part and the metallic chamber; and a transparent window through the top of said enclosing container and said metallic chamber.

2. Therapeutic heating apparatus comprising the combination of a metallic chamber for receiving within it the part to be treated and made of a metal such as copper; insulated electrical resistance heating wiring applied exteriorly to the sides of said metallic chamber as distinguished from its top and bottom; a heat-confining container enclosing all of the foregoing; and a transparent window through the top of said enclosing container and said metallic chamber.

3. Therapeutic heating apparatus comprising the combination of a metallic chamber for receiving within it the part to be treated and made of a metal such as copper; an enclosing container for said chamber, said container and chamber combinedly having an opening through them closed by a window; and insulated electrical resistance heating wiring located in the space between the inside of the container and the outside of the metallic chamber.

4. Therapeutic heating apparatus of the class described comprising the combination of a chamber surrounding the part to be treated and substantially cutting off circulation of outside air through said chamber;

and a heating element with a suitable cuprous metal shield therefor between said element and said chamber arranged to heat the interior of said chamber substantially only by the radiation from said shield.

5. Therapeutic heating apparatus of the class described comprising the combination of a chamber surrounding the part to be treated and substantially cutting off circulation of outside air through said chamber; and heating means arranged and adapted to heat the interior of said chamber substantially only by heat radiated from material having the property of transforming burning heat rays and radiating same in substantially nonburning form.

6. Therapeutic heating apparatus of the class described comprising the combination of a cuprous metal walled chamber surrounding the part to be treated and substantially cutting off circulation of outside air through said chamber; and a heating element arranged and adapted to indirectly heat the interior of said chamber substantially solely through the cuprous metal of said wall and by radiation from said metal.

Signed at New York in the county of New York and State of New York this 9th day of February A. D. 1928.

ARTHUR POT.