Nov. 9, 1937. C. F. KETTERING ET AL 2,098,295

METHOD OF AND APPARATUS FOR CREATING AN ARTIFICIAL FEVER

Original Filed March 17, 1933 2 Sheets-Sheet 1

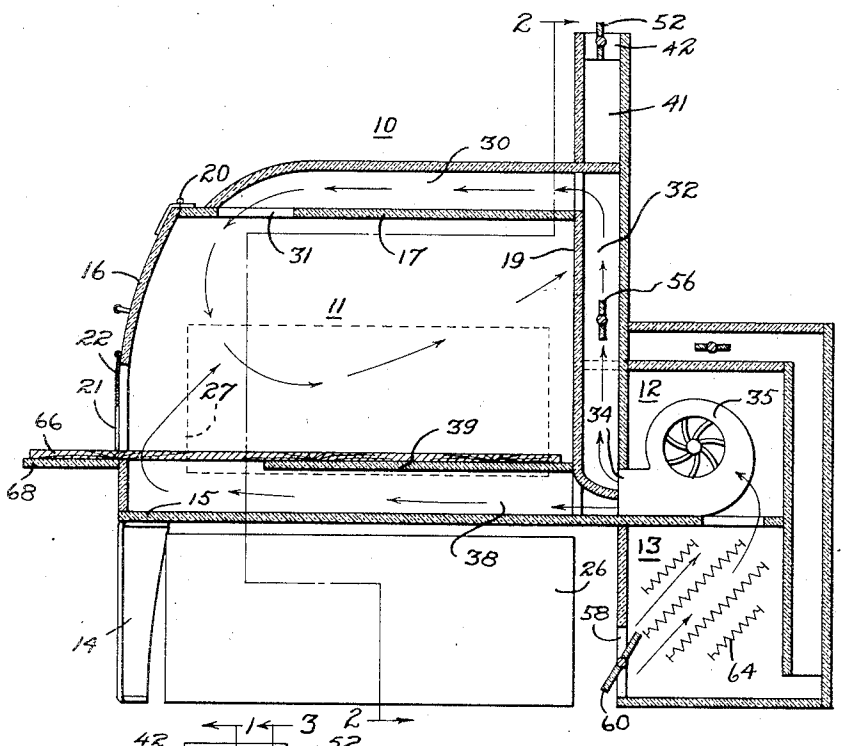

Fig. 1

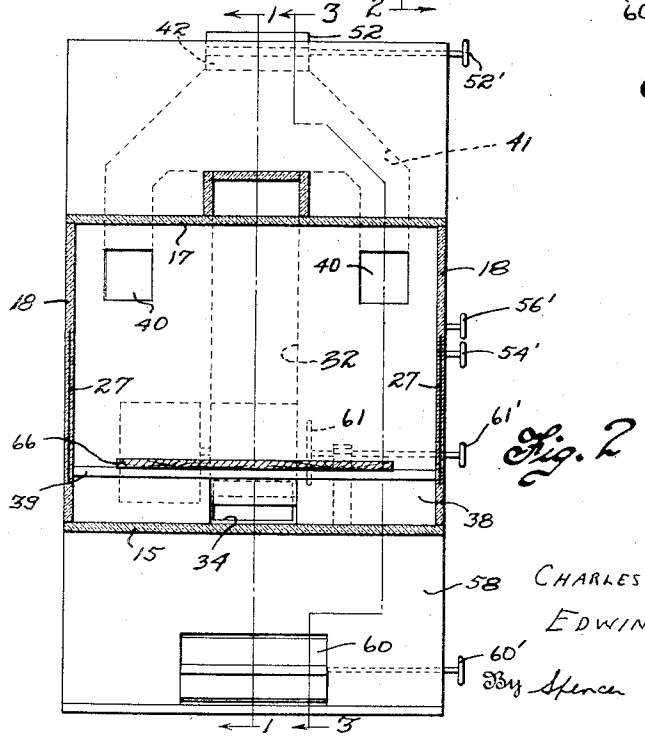

Fig. 2

Inventors
CHARLES F. KETTERING AND
EDWIN C. SITTLER
By Spencer Hardman & Fehr.
Attorneys

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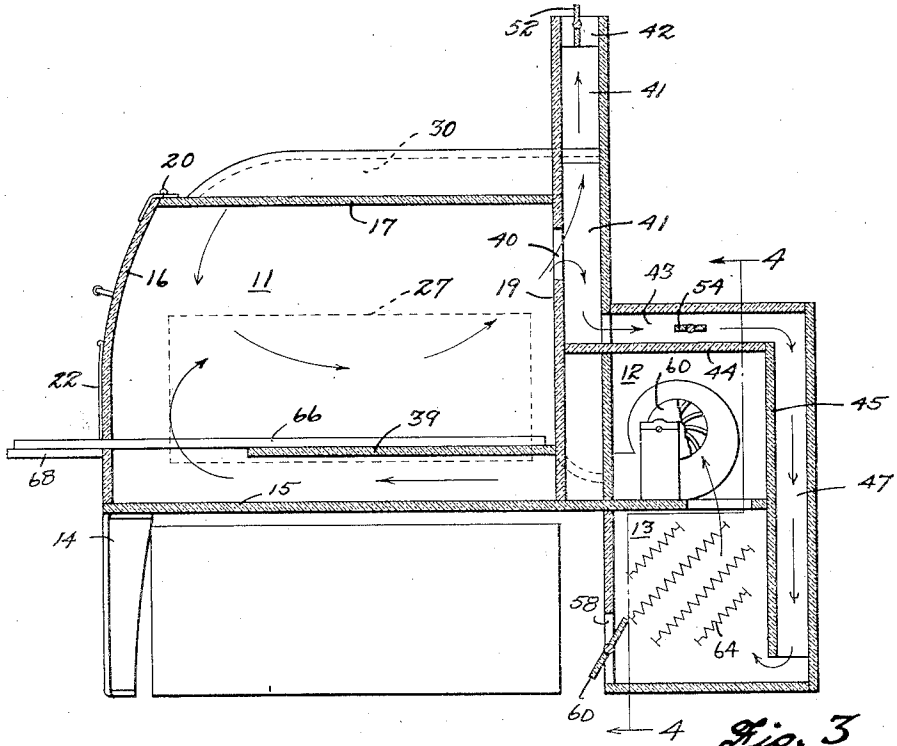

Fig. 3

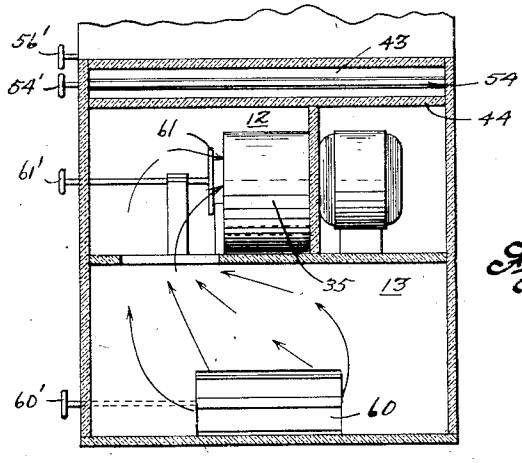

Fig. 4

Inventor

CHARLES F. KETTERING AND

EDWIN C. SITTLER

By Spencer, Hardman & Fehr.

Attorneys

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METHOD OF AND APPARATUS FOR CREATING AN ARTIFICIAL FEVER

Charles F. Kettering and Edwin C. Sittler, Dayton, Ohio, assignors, by mesne assignments, to General Motors Corporation, a corporation of Delaware

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4 Claims. (Cl. 128—373)

This invention relates broadly to methods of and apparatus for producing and maintaining in human bodies a condition of fever for the purpose of curing, or at least relieving certain diseases.

A condition of fever or in other words, a high body temperature has a decided remedial effect on certain diseases. This fact has been known to the medical profession for some time, although the exact action in such cases is still more or less unknown. In many instances, particularly in extreme cases, this remedial effect of a condition of fever has been utilized by subjecting the patient to certain other diseases such as malaria or the like. Obviously this method has its disadvantages since the remedy may prove as dangerous as the disease it seeks to cure, and consequently has been resorted to only in extreme cases.

Because of these facts, attempts have been made to artificially produce a condition of fever in human bodies. One such method has been the subjecting of the patient to an electrostatic field, created by a machine capable of producing a very high frequency alternating current. Such machines consist generally of an oscillating tube and a rectifier tube and resemble in practically every detail the ordinary radio machine used for broadcasting purposes. Hereinafter this machine is generally referred to as a high frequency alternator.

In the use of such high frequency alternator it has been found that the patient is subjected to severe body burns. It is believed that these burns are caused by the fact that the body lying as it does in the electrostatic field gives off an increasing amount of perspiration as the body temperature increases. The burns are probably due to the fact that small pools of perspiration heat more rapidly than the body itself and to the electrical discharge across such small bodies of perspiration.

Our invention aims to overcome the foregoing objections to these high frequency alternator machines and has for its object the provision of methods of and apparatus for maintaining the body of the patient relatively dry while it is being subjected to the electrostatic field.

A further object, and equally as important as the first, is the provision of a method of and apparatus for supplementing the heating effect of the electrostatic field and also for maintaining the body of the patient at a fever temperature for a considerable length of time after the operation of the high frequency alternator has been discontinued.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical sectional view taken through a cabinet, with the radiotherm machine shown in elevation;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2, also showing the radiotherm machine in elevation, and

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3.

As one specific embodiment of an apparatus capable of carrying out our method, we have shown, as generally indicated by the reference character 10, a housing or cabinet. This cabinet includes three compartments, an operating compartment indicated by the reference character 11, a blower compartment indicated by the reference character 12 and a heating compartment indicated by the reference character 13. The operating compartment 11 is supported at its forward end by means of the legs 14 and at its rear end by means of the heating and blower compartments 12 and 13. The operating compartment 11 includes the bottom wall 15, the forward wall 16, top wall 17, side walls 18 and a rear wall 19, the forward wall 16 being pivoted to the top wall 17 as indicated at 20. The forward wall 16 is also provided with an opening 21 which opening is adapted to be closed by means of a curtain 22.

Means are provided for creating an electrostatic field within the operating chamber and to this end we have shown, as generally indicated at 26, a high frequency alternator machine. It should be understood that this alternator is an apparatus capable of producing a very high frequency alternating current and since the details of this machine form no part of the present invention, such details have not been disclosed. It should be understood that the high frequency alternator is connected to the two plates 27, one located in each side wall of the cabinet in order to intensify the electrostatic field in the operating compartment between the two plates.

We also provide means for properly conditioning the body of the patient to maintain it in a substantially dry condition while being subjected to the effects of the electrostatic field. For example, a flue indicated at 30 is formed on the

top of the operating chamber 11 and communicates with a discharge opening 31 formed in the top wall 17. At its other end the horizontal flue 39 communicates with a vertically extending flue 32 formed on the outside of the rear wall 19, this flue being in turn connected with the outlet 34 of the blower 35 located within the blower compartment 12.

Located along the floor of the chamber 11 is a second horizontally extending flue 38 formed by means of the false bottom 39. This flue 38 also communicates with the discharge 34 of the blower 35 and with the forward end of the operating compartment 11 as shown in the drawings.

Thus, with the blower 35 in operation, air, the source of which will be hereinafter described, is discharged from the outlet 34 into the flue 38 and into the flues 32 and 39 to be discharged from the said flues into the operating compartment at the forward end thereof.

We also provide means for either re-circulating the air from the compartment 11 or for discharging the air outside of the apparatus, or discharging only a limited quantity of air and recirculating the remainder thereof. For example, openings 40, Fig. 2, formed in the rear wall 19 of the compartment 11 communicate with vertically extending flues 41 converging into the discharge flue 42. The flues 41 communicate at their lower end with the horizontal flue 43 formed on the top wall 44 of the blower compartment 12. Extending down the rear wall 45 of both the blower compartment 12 and the heating compartment 13 is a flue 47, which flue communicates at its upper end with a flue 40 and at its lower end communicates with the heating compartment 13. Thus, air escaping from the operating compartment 11 may pass upwardly through the flues 41 and the discharge flue 42 to the outer atmosphere or may pass through the flue 43, downwardly through the flue 47 to be recirculated through the compartment and the blower compartment.

To control the circulation of air through the operating compartment, we provide a plurality of dampers, herein shown as hand operated dampers located in the various flues. For example, in the outlet flue 42 there is located a damper 52, controlled by handle 52', while in the return flue 43 there is provided a damper 54, operated by handle 54'. Also, in the feed flue 32 there is provided a damper 56, operated by handle 56', while in the fresh air intake 58 to the heating compartment there is provided a damper 60 controlled by the handle 60'. Also, we provide a damper 61, located in the inlet to the blower 35 and controls this damper by handle 61'.

Means are provided for properly heating the circulating air and in this modification there is disclosed a plurality of electrical resistances constituting heating devices 64 located within the heating compartment 13.

Within the operating compartment 11 there is shown a stretcher 66 supported at its forward end on the outwardly extending platform 68 formed on the front wall 16 of the operating compartment 11 and supported at its rear end on the false bottom 39.

In the operation of the device hereinbefore disclosed, the body of the patient is located on the stretcher 66, with the head of the patient of course resting on that portion of the stretcher 66 that is shown supported on the platform 68. In other words the head of the patient is located outside of the operating compartment 11. The high frequency alternator machine is connected to the usual electrical source, for instance a 110 volt supply, and the electrostatic field is created between the plates 21. The body of the patient is therefore positioned in the very powerful electrostatic field and is subjected to the heating effect thereof. At the same time blower 35 is started in operation to circulate air over the heating device 64 through the flues 38 and 32 into the operating chamber 11. The temperature of the circulating air may vary from 150 to 200° F., depending upon the particular patient being treated. We attempt to maintain the wet bulb temperature at substantially 105 to 110° so as to assist the high frequency alternator in raising the temperature of the body of the patient to fever temperature.

During the operation of the high frequency alternator machine we have found that it is advantageous to permit from 5 to 20% of the air circulating through the operating compartment 11 to be discharged through the outlet flue 42, the remainder of the air being, of course, recirculated over the heating coils 64. This, of course, is accomplished by properly arranging the dampers 54 and 52.

The alternator is continued in operation until the body of the patient reaches a temperature of substantially 104 or 105°, at which time the intensity of the electrostatic field may be decreased by lowering the power of the high frequency alternator machine or it may be discontinued entirely.

If the machine is cut off when the body of the patient has reached substantially 104 to 105° F., the circulation of the air is continued and practically none of the air is permitted to be discharged to the atmosphere through the discharged conduit 42. At the same time the temperature of the air may be lowered and the humidity increased since the presence of perspiration on the body will cause no burning effect, due to the fact that the high frequency alternator has been discontinued. The velocity of the air may also be decreased.

The humidity of the circulating air may be increased in any known manner, for example, by injecting steam through the inlet opening 58, by providing a supply of water in the heating compartment 13, or by any of the known artificial means for humidifying the air.

It has been found that in such a device as herein disclosed, it is possible to treat the patient in the electrostatic field for a period of from three-quarters of an hour to one hour to properly increase the body temperature to that desired. Afterwards for a period of from four to five hours the fever may be maintained in the body of a patient without the operation of the high frequency machine by merely circulating the humid air by means of the blower 35.

Hereinbefore we have described the high frequency machine as located in or near the operating compartment 11. It is of course possible to first treat the patient in a cabinet wherein the electrostatic field is created and then remove the patient to a second cabinet wherein it may be subjected to the effect of the heated humid air. This latter method has the advantage in that a more comfortable means for supporting the patient may be provided in a second compartment and since the patient may spend much time, say from

four to five hours in the second compartment, comfort is desirable.

It will be noted that by our process the patient may be treated in an electrostatic field in safety since the circulating air removes excess perspiration, maintaining the body of the patient relatively dry. At the same time, the apparatus may be so controlled that the heating effect of the electrostatic field is required for only a short period of time, and the humidity and temperature of the atmosphere may be so controlled as to maintain the fever temperature for a considerable period of time after the high frequency machine has been discontinued.

While herein we have disclosed a high frequency alternator comprising substantially a radio machine, it should be understood that such a high frequency alternator may comprise a spark gap or other device.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Process comprising subjecting a human body to the effect of a high frequency field to create a fever in said body and at the same time maintaining the body substantially dry.

2. Process comprising subjecting a human body to the effect of a high frequency field to thereby create a fever in said body, and at the same time circulating warm air over the body to maintain it relatively dry.

3. An artificial fever producing machine comprising a plurality of walls surrounding and forming an enclosure for a portion of the body of the patient, means for creating a high frequency field within the enclosure, and means for circulating warm air through the enclosure.

4. An artificial fever producing machine comprising a plurality of walls surrounding and forming an enclosure for a portion of the body of the patient, means including electrical plates incorporated in the walls for creating a high frequency field within the enclosure, means for circulating air through the enclosure, and means for heating the circulating air.

CHARLES F. KETTERING.
EDWIN C. SITTLER.