Sept. 22, 1970 SAKARI KUJANSUU 3,530,277

SAUNA HEATER

Filed June 12, 1968 3 Sheets-Sheet 1

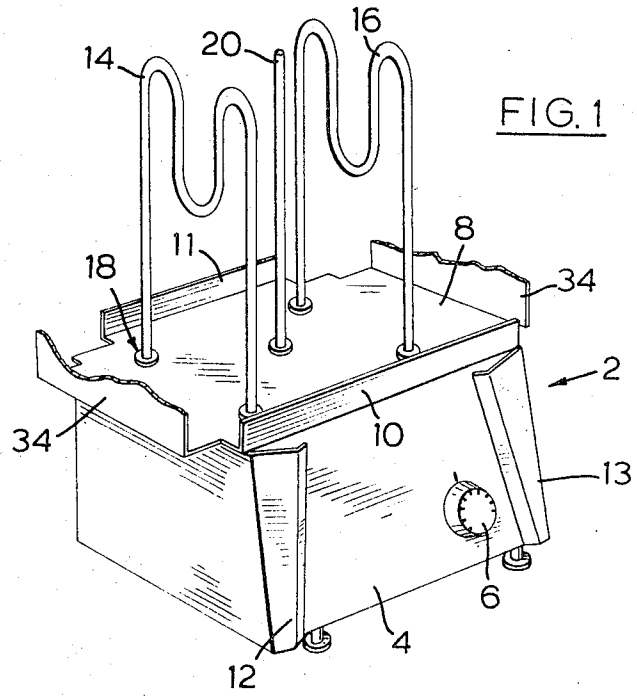


FIG. 1

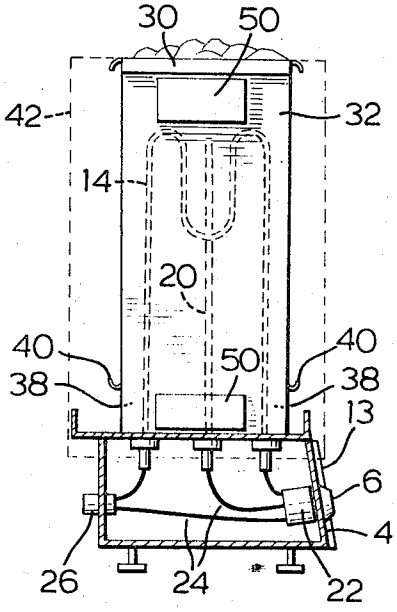


FIG. 2

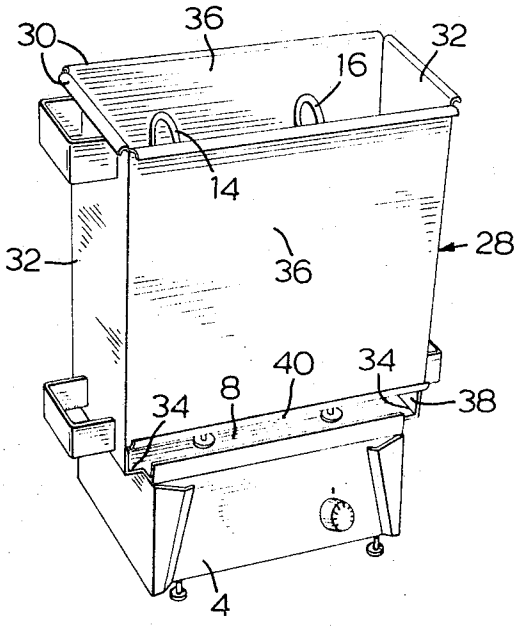


FIG. 3

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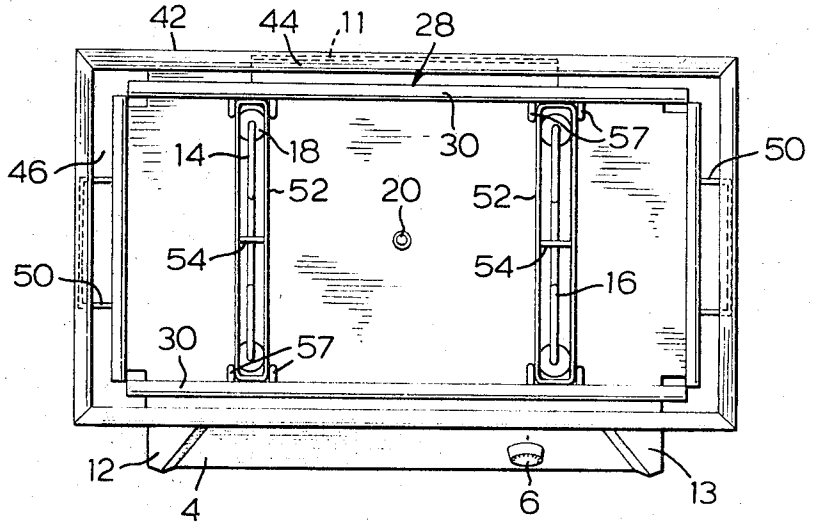
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FIG. 4



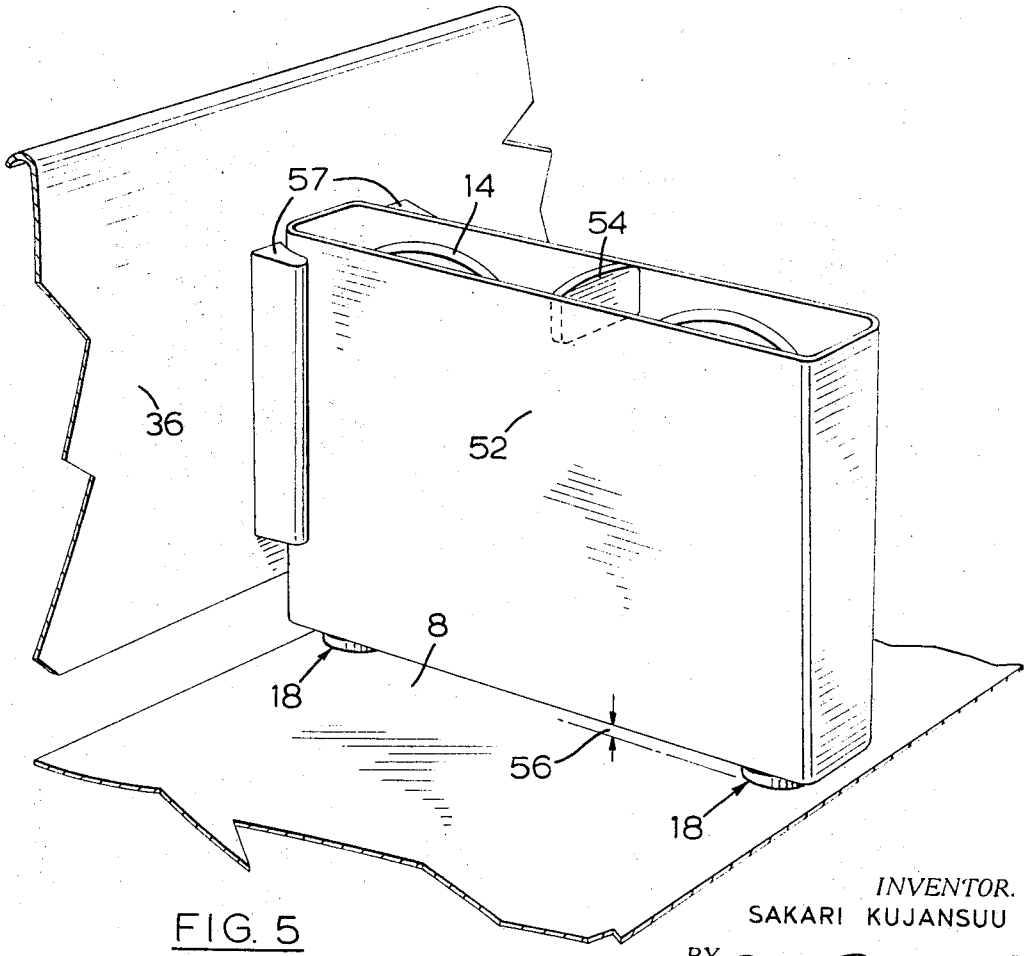


FIG. 5

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SAUNA HEATER

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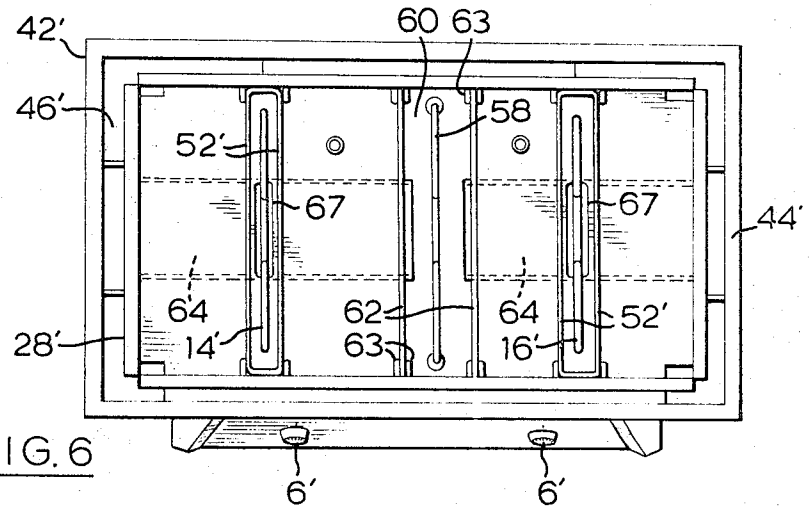


FIG. 6

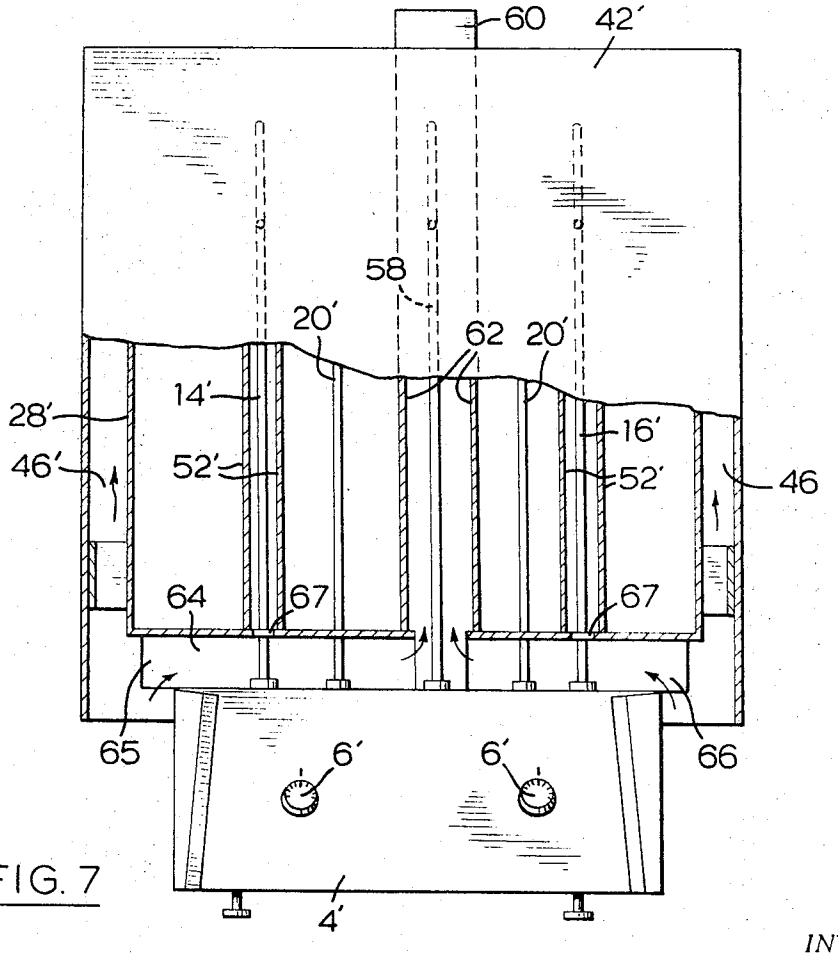


FIG. 7

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3,530,277

SAUNA HEATER

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Int. Cl. A61h 37/00; H05b 1/00
U.S. Cl. 219—365 12 Claims

ABSTRACT OF THE DISCLOSURE

A sauna heater having a control box, an inner rock container above the control box, and an outer shield surrounding and spaced from the inner container. The space between the shield and container is open at its top and bottom, and the lateral dimensions of the control box adjacent the bottom of the shield are less than those of the shield, so that cool air near the floor is sucked up into the space between the shield and container to cool the control box.

The inner container contains electric elements each surrounded by an element protector spaced slightly from the bottom of the inner container. Air enters the bottom of the element protectors, rises therethrough to cool the elements, and then heats rocks placed above the element protectors.

This invention relates to an electrical sauna heater.

Electrical sauna heaters, in which an electrical heating element heats rocks to provide either dry steam if no water is put on the rocks, or wet steam if the rocks are wetted, are very well known. However, such heaters have in the past usually been bulky, clumsy or complicated devices that commonly required a considerable period of time before reaching operating temperature. In addition, the controls and electrical connections of the prior art heaters were usually not well sheltered from the heat produced by the elements, making control of the prior art heaters difficult. A further defect of the prior art heaters was that the heater elements were usually buried deeply in the rocks, or else projected above the rocks, and in both cases this resulted in inadequate heating of the top rocks. Since the top rocks are the first to be cooled when water is poured on the rocks, it is desirable to maintain the top rocks at as high a temperature as possible.

Accordingly, it is an object of the present invention to provide a sauna heater in which a control box for electrical connections and controls is located below the container for stones and the remainder of the heater, and a shield is spaced around the stone container, the shield being open at its top and bottom to permit convective air flow from the stone container and the shield, the lateral dimensions of the control box adjacent the bottom of the shield being less than the lateral dimensions of the shield, so that relatively cool air near the floor of the room is sucked up past the sides of the control box to cool the controls and electrical connections.

A further object of the invention is to provide means to minimize overheating of the elements and at the same time to ensure that the top rocks in the heater are heated to the same extent as the lower rocks, or to a greater extent than the lower rocks. This is accomplished in a typical embodiment of the invention by providing an element protector around the electrical element to form a duct therearound, the bottom of the element protector being spaced slightly above the bottom of the stone container, so that air is sucked into the element protector and rises past the element to cool the element. The top of the element protector is above the top of the element but below the top of the stone container, so that rocks sitting above the element cover are subjected to a strong flow of highly heated air. This produces the unique result

that the top rocks are heated to a greater extent than the bottom rocks, resulting in an efficient heater.

Further objects and advantages of the invention will appear from the following disclosure, taken together with the accompanying drawings, in which:

FIG. 1 is a front perspective view of a heater according to the invention with the inner rock container, outer shield, and element protectors removed;

FIG. 2 is a side view of the heater with the outer shield and elements shown in dotted lines and with the control box in section;

FIG. 3 is a front perspective view of the heater with the outer shield and elements protectors removed;

FIG. 4 is a top view of the heater;

FIG. 5 is a perspective view showing an element protector and its spacing from the bottom of the inner rock container;

FIG. 6 is a top view of a modification of the invention; and

FIG. 7 is a front view partly in section of the modification of FIG. 6.

Reference is first made to FIG. 1, which shows a control box **2** of generally rectangular shape. The control box **2** includes a downwardly and outwardly sloping front face **4** having a control knob **6** thereon to set the temperature of the heater. The control box also includes an upper plate **8** which also forms the bottom of the inner rock container to be described, a front flange **10** to retain rocks and to prevent water from dripping on the front face, and a rear protruding spacer flange **11**. The sides of the control box are folded over the front (and rear) faces as indicated at **12**, **13** and are riveted thereto, thereby forming slight protrusions from the front face for a purpose to be described.

Mounted on the upper plate **8** of the control box **2** are a pair of electrical heater elements **14**, **16** each formed generally in the shape of the letter M and each lying generally in a plane. The heater elements **14**, **16** are fixed to the control box by any suitable means, such as a copper asbestos sleeve and nut combination diagrammatically indicated at **18**. A thermostat sensor element **20** similarly extends upwardly from the upper plate **8** of the control box.

The heater elements **14**, **16** and the thermostat sensor element **20** protrude below the upper surface of the control box **2** (FIG. 2) and are connected to a thermostat control **22** coupled to the control knob **6**, and are also connected via conventional wiring **24** to an outlet **26** for the device.

The inner rock container (best shown in FIG. 3) for the heater is indicated at **28**. Container **28** is rectangular as viewed from above and contains rolled-down upper edges **30** to increase its strength. The sides **32** of the inner container **28** are supported by two downwardly and inwardly directed flanges **34** extending to the sides of the upper plate **8** of the control box, while the front and rear faces **36** of the container are spaced above the upper plate **8** of the control box, while the front and rear faces **36** of the container are spaced above the upper plate **8** of the control box, leaving gaps **38** therebetween through which air is sucked into the inner container. The bottom edges of the front and rear faces **36** of the inner container are rolled as indicated at **40** for increased strength. As mentioned, plate **8** of the control box **2** forms the bottom surface of the inner container.

It will be noted that the inner container **28** is quite deep, being of a depth slightly greater than its length and much greater than its width. The inner container is normally made of fairly heavy gauge sheet steel.

Surrounding the inner container **28** and spaced therefrom is an outer shield **42** (shown in FIG. 4 and in

dotted lines in FIG. 2) made of lighter steel than the inner container since it is not in close contact with heated rocks and water.

The top of the outer shield **42** is bent over to form a top rim **44** (FIG. 4), and the dimensions of the outer shield are such that there is a gap **46** between the outer shield and the inner container **28**, the gap extending all the way around the inner container. The outer shield **42** is held in spaced relation to the inner container by a pair of supports **50** extending from each side of the inner container, and by the flange **11** extending from the rear of plate **8** of the control box, and by engagement of the shield **42** with the sloping protrusions **12, 13** at the front surface **4** of the control box. Screws may be used to secure the shield to the projections **50** if desired.

When the outer shield **42** is installed, its top will be substantially flush with top of the inner container **28**, and its bottom will extend to a position just below the bottom projections **50** and the rear flange **11**, as shown in FIG. 2.

The electrical elements **14, 16** in the inner container are protected by element protectors or covers **52** (FIGS. 4 and 5). The element protectors **52** are of sheet metal metal and contain inwardly directed tabs **54** to strengthen their walls against inward collapse. As shown in FIG. 5, the spacing of the walls of the element protectors is less than the width of the fastening means **18** for the elements, so that the bottoms of the element protectors **52** rest on the tops of the fastening means **18**, thus spacing the bottoms of the element protectors from the bottom plate **8** of the inner container by a small distance, the gap being indicated at **56**. The gap **56** permits air entering the inner container via gaps **38** to enter the bottoms of the element protectors **52** and then flow upwardly through the element protectors, which thus form air ducts. The element protectors are retained in position in the inner container **28** by guides **57** welded to the sides of the inner container.

It will be noted that the element protectors **52** terminate above the tops of the elements **14, 16**, but below the top of the inner container **28**. This permits rocks to be piled in the inner container on and above the element protectors. Since the tops of the element protectors are open in a narrow slot-like gap, the rocks (which are usually about fist size) rest above the element protectors **52** without entering the protectors and damaging the elements.

The operation of the apparatus just described is as follows. Firstly, the control knob **6** is turned to set the heater to a desired temperature. This energizes electrical elements **14, 16** and heating begins of rocks placed in the unit. During the initial heating interval, air is sucked through the bottom of the space **46** between the outer shield **42** and inner container **28**, and through the gaps **36** in the walls of the inner container to rise through the rocks in the inner container, to establish a convective air circulation which speeds the heating process. Air is also sucked through the gap **56** at the bottom of the element protectors **52** and upwardly through the element protectors to improve the air circulation. The flow of air through the element protectors protects the elements **14, 16** against overheating and ensures that the upper rocks (which will be the first to be cooled when water is poured in the rocks) will be hot and remain hot.

Air entering the bottom of the space **46** between shield **42** and inner container **28** also flows straight upwardly through this space, absorbing heat from the inner container and keeping the shield **42** cool enough that it can be safely touched.

When the device reaches operating temperature, this is sensed by the thermostat sensor **20**, and the elements are shut off by the thermostat until such time as the rocks cool to below the turn-on temperature of the thermostat. The air circulation previously mentioned continues so long as the rocks remain hot.

Because the lateral dimensions of the control box **2** at its top are less than those of the outer shield **42**, and because the outer shield **42** terminates just below the top of the control box, air sucked upwardly into the bottom of space **46** sweeps past the exposed surfaces of the control box. This includes the front face **4** of the control box, because the bottom of the shield **42** is held spaced from the bulk of the front face **4** by the protrusions **12, 13** formed by the folded sides of the control box. This air, which is the coolest air in the room, assists substantially in cooling the control box.

If desired, to assist in cooling the control box **2**, the top plate **8** may be formed as a pair of horizontal plates, with spacing washers between them, and with insulation between them if desired. This will reduce heat leakage to the control box.

Reference is next made to FIGS. 6 and 7, which show an alternate construction for increased air circulation. In this embodiment, in which primed reference numerals indicate corresponding parts, a further electrical element **58** is placed in a relatively wide air duct **60** formed by a pair of sheet metal element protectors **62** retained in position by guide flanges **63**. A horizontal air duct **64** is located at the bottom of the inner container **28'** and has open ends **65, 66** through which air is sucked from the bottom of the air space **44'** between the outer shield **42'** and the inner container **28'**. This air is delivered, without flow restriction, into the wide central duct **60** formed by element protectors **62**. The top of duct **60** extends above the top of the outer shield **42'** and inner container **28'**, to prevent entry of rocks and so that increased air circulation will occur.

Smaller openings **67**, in the top of the duct **64** also feed air into the narrow ducts formed by element protectors **52'**. A pair of control knobs **6'** are provided, each connected to a thermostat sensor **20'** one to control elements **14', 16'** and the other to control elements **58**. This embodiment, because of its wide vertical central duct and high capacity air delivery into this duct, provides a very high rate of air circulation through the unit.

Although a rectangular shape in top plan view has been illustrated, it will be apparent that other shape (as viewed from above) may be employed if desired.

What I claim as my invention is:

1. An electrical sauna heating unit comprising

(a) a relatively deep inner container for rocks, said inner container having a bottom wall and an encircling side wall, said side wall having openings therein adjacent said bottom wall for air flow into said inner container, said inner container being adapted to receive rocks therein,

(b) electrical means for heating said rocks,

(c) an electric control box, having heater control means therein, located below said bottom wall of said inner container and supporting said inner container at the bottom wall of said inner container said control box having operator control means projecting from one side thereof.

(d) a substantially vertical outer shield spaced laterally from and encircling said inner container, said shield extending downwardly substantially from the top of said inner container and terminating at a position substantially above the bottom of said control box, said shield being open at its top and bottom to permit convective air flow between said inner container and said shield,

(e) the lateral dimensions of said control box adjacent the bottom of said shield being less than the lateral dimensions of said shield, so that relatively cool air to be heated and sucked upwardly into said inner container and into the space between said shield and said inner container will sweep past the sides of

said control box, to cool said control box and to cool said operator control means.

2. A heating unit according to claim 1 wherein said means (b) comprises at least one electrical element projecting upwardly in said inner container and extending a substantial portion of the height of said inner container, an element protector enclosing said element to prevent rocks from contacting said element, the top of said element protector being open, and means for admitting air into said element protector adjacent the bottom thereof to permit flow of air upwardly through said element protector, thus, to reduce the likelihood of overheating of said element.

3. A heating unit according to claim 2 wherein the tops of said element and element protector are located below the top of said container, so that said air flow through said element protector will heat rocks placed above said element protector.

4. A heating unit according to claim 3 wherein said means for admitting air into said element protector comprises means spacing the bottom of said element protector from said bottom wall of said inner container by a small distance, to provide a gap through which air at the bottom of said inner container by a small distance, to provide a gap through which air at the bottom of said inner container may flow into said element cover.

5. A heating unit according to claim 3 wherein said element is generally M shaped and lies substantially in a vertical plane, and said element protector includes a pair of flat sheet-like sides one on each side of said element and defining a narrow slot-like space through which air may rise.

6. A heating unit according to claim 2 wherein said means for admitting air into said element protector comprises a horizontal duct adjacent said bottom wall, said horizontal duct communicating between the bottom of said element protector and the space between said shield and said inner container, for feeding air from between said shield and said inner container into the bottom of said element protector.

7. A heating unit according to claim 1 wherein said means (b) includes three electrical elements projecting upwardly in said inner container, element protectors enclosing each of said elements to prevent rocks from contacting said elements, said element protectors defining upwardly rising ducts through which air may rise, and a horizontal duct adjacent said bottom wall, said horizontal duct communicating between the space between said shield and said inner container and the bottom of at least one of said upwardly rising ducts, for feeding air from between said shield and said inner container into said one of said upwardly rising ducts.

8. A heating unit according to claim 7 wherein said

elements are elongated and lies substantially in a vertical plane, said element protectors each having a pair of sheet-like sides to form said upwardly rising ducts, said elements and element protectors being arranged in parallel relationship and extending across said inner container as viewed from above, to divide said inner container into four compartments.

9. A heating unit according to claim 8 wherein the duct formed by the middle element protector is substantially wider than the ducts formed by the other element protector and extends above the top of said inner container, such wider duct being said one duct.

10. An electric sauna heating unit comprising

(a) a relatively deep container for rocks, said container having a bottom wall and an encircling side wall, said side wall having openings therein adjacent said bottom wall for air flow into said container,

(b) means for supporting said container,

(c) at least one electrical element projecting upwardly in said container from said bottom wall and extending a substantial portion of the height of said container,

(d) an element protector enclosing said element and forming a narrow slot-like duct therearound, the bottom and top of said element protector being open for passage of air therethrough,

(e) and means for admitting air into said element protector adjacent the bottom thereof.

11. A heating unit according to claim 10 wherein the tops of said element and element protector are located below the top of said container, so that air flow through said element protector will heat rocks placed above said element protector.

12. A heating unit according to claim 11 wherein said means for admitting air into said element protector comprises means spacing the bottom of said element protector from said bottom wall of said inner container by a small distance, to provide a gap through which air at the bottom of said inner container may flow into said element protector.

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U.S. Cl. X.R.

219—367, 368, 373