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[54] SAUNA CABIN

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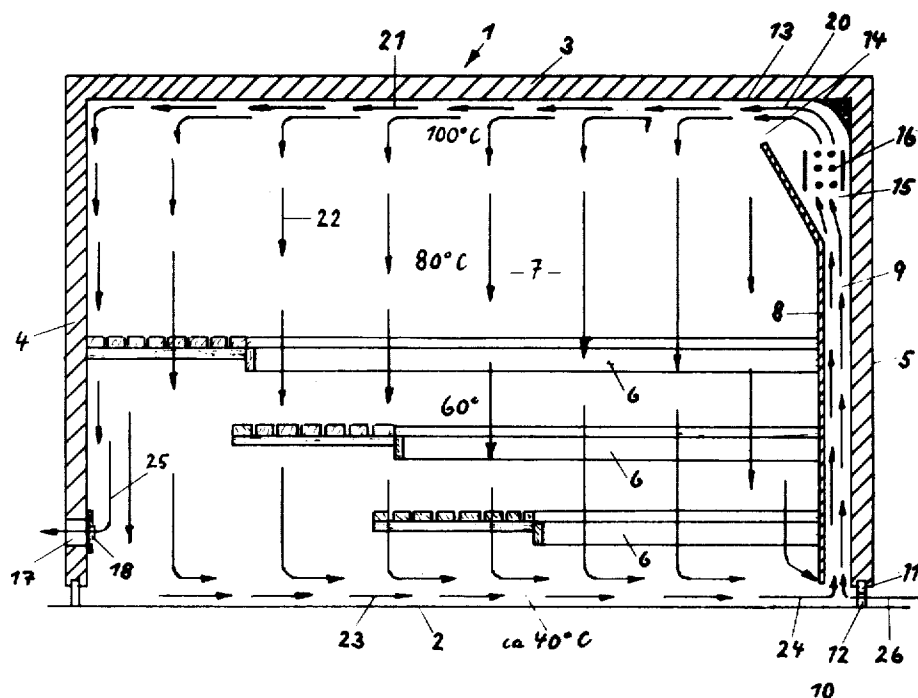
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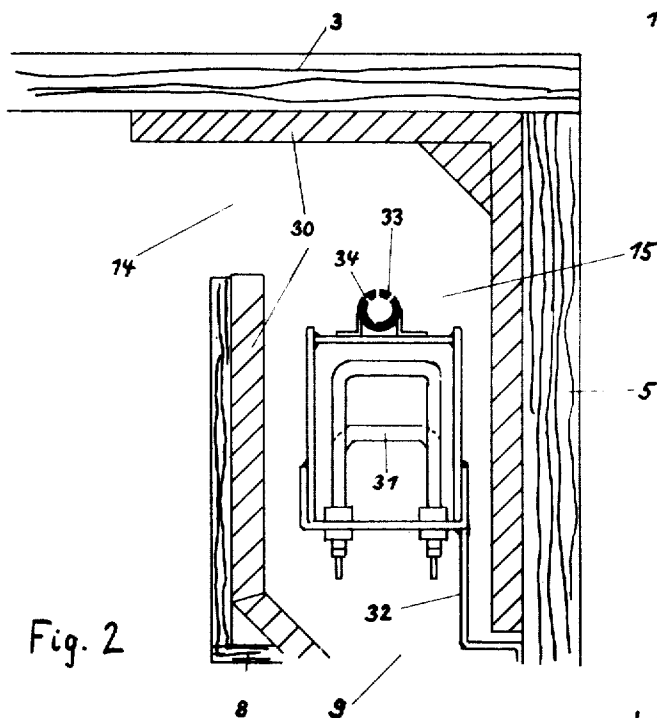
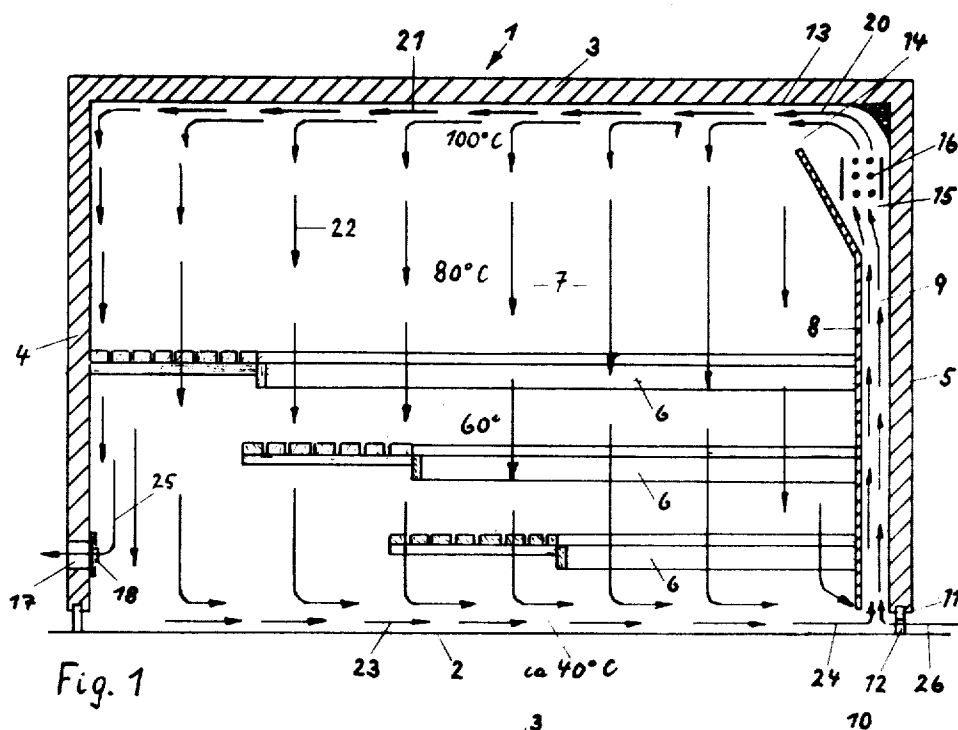
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[57] ABSTRACT

A sauna cabin in which the air, heated by a heater, enters the sauna cabin within the area of the ceiling and, after being cooled off, is conducted again to the heater by way of an opening within the area of the floor, the heater is thereby preferably arranged in a shaft formed by a covering panel disposed at a small distance from an outer wall of the sauna cabin.

24 Claims, 3 Drawing Figures

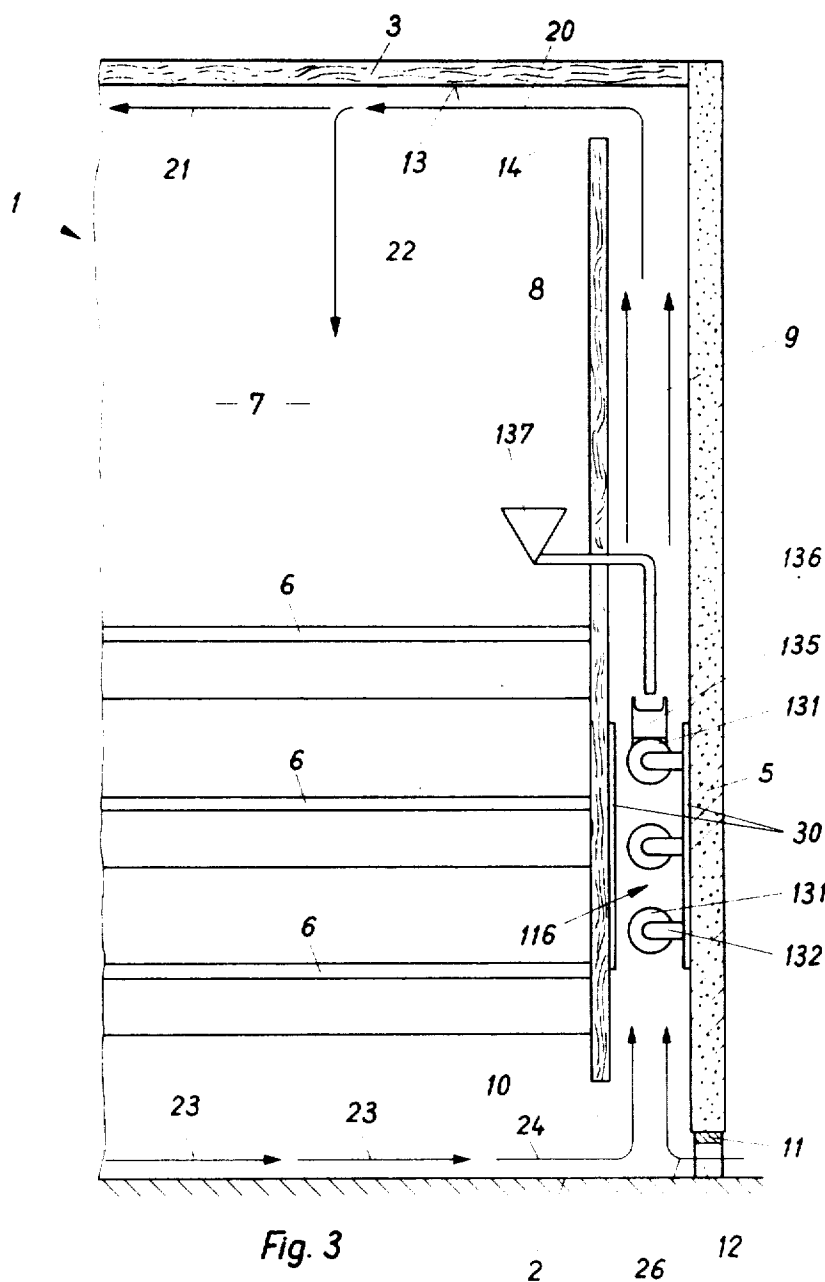




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SAUNA CABIN

The present invention relates to a sauna cabin with a heating installation heating the air and with removal of the cooled off air within the area of the floor of the sauna cabin.

Sauna cabins may be constructed in the most varied manners. At present, they are frequently constructed as prefabricated sauna cabins assembled from finished standardized parts which either are to be set up or mounted on the inside of a building or are to be set up also separately on the outside. The present invention is suitable for all types of construction of sauna cabins.

The heretofore known sauna includes as heating source a sauna oven installed or otherwise mounted at a place of the sauna cabin within the lower area thereof. This sauna oven consists of natural stones, metal or special ceramic constructions. It may be heated with wood, coal, preferably electricity, however, also with oil or gas or other fuels. Such types of heating sources draw in from below the cooled off air of the cabin space and/or the fresh air entering through the air inlet apertures of the cabin wall, heat the same and thereafter give off the same in the upward direction as heated or hot air. An automatic air-circulation in the sauna space results therefrom. In order to permit spent or stale air to leave and thereby enable a fresh air admission, exhaust air apertures are provided, depending on the particular sauna construction, at different places of the cabin walls. With larger sauna cabins for many persons, under some circumstances, the fresh air admission is assisted by a fan.

In contradistinction to a residential heating system in which one seeks to achieve as much as possible a higher temperature in the lower areas of the space, in which the occupants live, the temperature should increase as much as possible in the sauna space in the upward direction in order that one is more strongly heated during a stay on higher benches. The temperatures in the relatively dry sauna air with a humidity of about 5 to 10 percent are considerable and reach in the upper zones of the sauna approximately 100° C., with a maximum of about 120° C.

With the known heating and air-conduction systems of the sauna, the hot air flow or stream starts from a relatively narrowly defined and relatively low place, namely, from the sauna oven. On the one hand, an air flow or air stream thereby rises upwardly, but distributes itself at the same time obliquely to the sides and thus produces certain turbulences in the sauna space. As a result thereof a uniform temperature stratification does not occur in the sauna space and the user is considerably more strongly heated from the side on which the heating source is located, especially with relatively small sauna cabins, than from the other side, on the one hand, by the warm air flow stemming from this one side and, on the other, in various sauna types also by the radiated heat emitted by the oven. This may lead to an unpleasant burning of the skin. One does not endure in such a type of sauna as high a temperature as would be experienced still agreeable with a uniform temperature stratification in the sauna space.

The aforementioned disadvantages of the known types of sauna are intended to be avoided above all by the present invention, especially the advantages to be described more fully hereinafter are to be achieved by

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the present invention and sauna cabins and/or heating and air conduction systems for saunas are to be made available by the present invention which assure with simple means a uniform temperature stratification and uniform air flow possibly in the entire sauna space. This can be achieved according to the present invention if the air heated by the heating installation enters the sauna space, properly speaking, within the area of the ceiling of the sauna cabin. As a result thereof, no upwardly directed air flow occurs any longer in the sauna space since the hottest air is supplied within the area of the ceiling. It distributes itself uniformly below the ceiling and during cooling off then sinks slowly and also uniformly in the downward direction. At the floor it then flows in the direction toward the exhaust apertures, i.e., either to the discharge apertures for the exhaust air or to the openings for the renewed heating of the air to be circulated. The sauna climate is favorably influenced thereby because the air flow is not disturbed by the upward movement, i.e., takes place over the entire cross-section of the sauna space only in a downward direction and as a result thereof, the flow velocity assumes a considerably smaller value. The temperature stratification characteristic for the sauna also takes place more accurately for the aforementioned reasons and in its effect is more favorable than with the heating system known heretofore. Thus, the purpose of the present invention, to accurately conduct accurately the air movement produced by the heating source and above all to conduct the rise, heated air separately from the slowly descending air, is assured in an excellent manner by the new heating system of the present invention.

The most varied heating sources which may be operated with electricity, gaseous, liquid or solid fuels, or heat-exchangers operating with other media can be used as heating installations. The constructive design of the heating installation as well as of the air-guide shafts for the conduction of the supply air to the heating source, properly speaking, and for the conduction of the heated air from the heating source to the inlet apertures into the sauna space may be selected in the most varied manner corresponding to the given type of construction of the cabin, the utilized heating installations and the like. The heated air inlet apertures for the sauna space may thereby be provided appropriately at the lower edge of the ceiling in one or several side walls of the sauna cabin. With smaller sauna cabins, one heated air inlet at one side wall will suffice whereas for the purpose of achieving as uniform as possible a temperature distribution also in the uppermost air layers with larger sauna cabins, the hot air inlet apertures may be arranged at oppositely disposed side walls or at side walls disposed at an angle to one another.

The present invention can be realized in a particularly simple manner if at least one side of the sauna cabin, a shaft is provided extending preferably over the entire width of the side wall, in which is arranged the heating installation and which is provided below the ceiling with the hot air discharge aperture and at the floor with inlet apertures for the cooled-off space air to be heated again.

In order that one is able to admix in this shaft also fresh air to the circulating air to be heated again, at least one fresh air inlet aperture is provided in the shaft.

Whereas it is important for the air flow in the sauna space that the opening for the space air to be heated again are provided in the shaft within the area of the floor of the sauna cabin, the fresh air inlet aperture which leads through the outer wall of the cabin may also be located somewhat higher. However, it is located below the heating installation and is appropriately provided also at the lower end of the shaft, and more particularly is located opposite to the circulating air opening.

The exhaust air aperture is appropriately provided in the wall of the sauna cabin opposite the hot air inlet, and more particularly in the lower area. One preferably provides the exhaust air apertures with the slide plates or dampers changing the cross-section thereof. One thus achieves a uniform flow in the cabin also with an open exhaust air slide member whose aperture cross-section also determines the proportion of the entering fresh air.

The shaft or compartment is appropriately formed by means of a partition wall mounted at a small distance from the outer wall of the sauna cabin. Practically no additional expenditures result therefrom since one only has to mount the customary wood paneling, already necessary anyhow in the sauna cabin, at a slight distance from the cabin wall. A high temperature-resistant liner is provided in the shaft within the area of the heating installation. The heating installation may be arranged at any desired place of the shaft without impairing the effect of the heating system to any significant extent. However, appropriately one provides the heating system at the upper end of the shaft because the heated air can then be conducted directly to the discharge aperture and circulating space air and fresh air can mix already in the shaft. Additionally, the useful space of the cabin is not impaired by the enlargement of the shaft necessary at the place of the heater element. A significant advantage of the present invention also resides in the fact that one can provide the heating installation directly below the ceiling whereas with the known heating systems, a considerable proportion of the base surface and therewith of the space available for the benches is required by the heater and in that additionally the benches and the places where the persons stay cannot be provided in direct proximity to the oven.

In order that one is also able to undertake a sprinkling or puring on of water, one arranges above the heating installation an evaporating pipe which is provided with water discharge apertures. The water discharge apertures are constructed as bores preferably provided at the top side.

Further objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, two embodiments in accordance with the present invention, and wherein:

FIG. 1 is a vertical cross-sectional view through a sauna cabin in accordance with the present invention;

FIG. 2 is a vertical cross-sectional view, on an enlarged scale, through the upper right corner of the sauna cabin with the heating installation in accordance with the present invention; and

FIG. 3 is a somewhat schematic, partial cross-sectional view through a sauna cabin within the area of the

shaft according to a further embodiment of the present invention.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, and more particularly to FIGS. 1 and 2, the sauna cabin generally designated by reference numeral 1 is assembled and set up on a floor 2 and has a ceiling 3 as well as side walls 4 and 5. Benches 6 are arranged in the sauna space at different heights, on which rest the persons, as is customary, depending on the desired temperature. The walls and ceiling are covered, as is customary, with special wood panels or the like, in a manner not illustrated in the drawing since it forms no part of the present invention.

A compartment or shaft wall 8 is provided at a small distance from the outer wall 5 which defines a shaft or compartment 9 between the outer wall 5 and the cover wall 8. This shaft 9 extends over the entire width of the sauna cabin. The shaft wall 8 terminates at the bottom at a distance from the floor 2 so that a flow opening 10 for the cooled-off space air of the cabin space, which is to be heated again, is formed. A fresh air inlet aperture 12 disposed opposite the shaft inlet or flow opening 10 is formed in the base 11 of the outer wall 5. The shaft wall 8 terminates at the top at a slight distance below the lower edge 13 of the ceiling 3 so that a hot air inlet aperture 14 is formed. A heating element 16 is arranged in the area of the upper end 15 of the shaft 9. An exhaust or discharge aperture 17 is provided in the side wall 4 disposed opposite the hot air inlet aperture 14 and within the lower area thereof whose cross-section can be adjusted by means of a slide plate 18, of conventional construction. As to the rest, the entire sauna cabin is conventionally closed. However, it also naturally includes a door (not shown). Furthermore, additional exhaust slide plates may be provided in the ceiling 3 which are opened only when the humidity content of the air is excessive, or if the sauna is out of operation.

OPERATION

The sauna constructed in accordance with the principle of the present invention operates as follows.

The air present in the shaft 9 is heated by the heating installation 16. It then leaves, as indicated by the arrows 20, in heated-up condition the hot air inlet aperture 14, spreads out according to the arrows 21 directly below the ceiling 3 and forms thereat an air layer of uniform temperature of, for example, about 100° C. This air layer cools slowly and falls with a uniform flow velocity in the downward direction as indicated by arrows 22 so that different air layers of uniform temperature decreasing in the downward direction are formed. Within the area of the floor, the temperature amounts to about 40° C. An air flow proceeding in a level manner now forms at the floor according to the arrows 23. The cooled-off air is sucked-in into the shaft 9, through the opening 10 according to the arrows 24, rises to the heating installation 16 within the shaft 9 separated from the remaining space air and is heated again. If the discharge slide plate 18 is opened, a corresponding proportion of the space air leaves through the discharge aperture 17 according to the arrow 25. A corresponding proportion of fresh air is also drawn into the channel 9, through the fresh air aperture 12 accord-

ing to the arrow 26, mixes within the channel 9 with the circulating air and is also heated-up by the heating installation 16. The purpose of the invention, to conduct accurately the circulating air movement produced by the heating source, to meter the necessary fresh air and above all to conduct the flow direction of the rising, heated air separately from the slowly sinking space air in separate shafts, is realized in an excellent manner by this arrangement. The metering of the fresh air supply can be regulated by the adjustable exhaust aperture 17 which is provided opposite the hot air inlet aperture 14.

As illustrated in detail in FIG. 2, a lining 30 is provided within the area of the upper end 15 of the shaft 9 which shields the walls consisting preferably of wood. For this purpose, conventional insulating materials, for example, conventional mineral insulating materials are used which are temperature-resistant up to about 300° C.

The heating installation consists in the illustrated embodiment of electric heating rods 31 which are secured in the shaft 9 by means of supports 32. An evaporating pipe 33 is secured at the support 32 above the heating rods 31. It is provided with water vapor discharge apertures 34. Water or vapor is introduced into the evaporating pipe for the realization of the steam jet which is then admixed to the hot air leaving at 14. An admixture of scenting ingredients can take place by an appropriate metering installation of conventional construction.

The embodiment of FIG. 3 differs from the embodiment described hereinabove only in that the cover 8 of the shaft 9 is arranged at a somewhat larger distance from the outer wall 5 than in the embodiments illustrated so far and that the heating installation 116 is arranged approximately in the lower third of the shaft 9. Three electric heating elements 131 are thereby arranged one above the other. They are secured at the outer wall 5 by means of supports 132 and extend over the entire width of the shaft. To both sides of the heating elements 131, the outer wall 5 and the shaft cover 8 are provided with liners 30 of insulating material.

A sprinkling dish 135 is provided above the uppermost heating element 131. The funnel pipe 136 of a filling funnel 137 terminates in the same. The filling funnel 137 is arranged within the sauna space 7. The funnel pipe 136 extends through the shaft covering 8. Thus, at the desired moment, the corresponding quantity of water which may possibly be mixed with the corresponding scenting ingredients, may be poured into the funnel 137 by the bathing person himself or by an attendant, then reaches the dish 135 and evaporates so that the vapors are admixed to the heated-up air and therewith the sauna climate is influenced in the desired manner. As to the rest, the operation of this embodiment is similar to that of the operation described hereinabove; also, similar reference numerals are used as before.

While I have shown and described only two embodiments in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art. For example, also other heating elements, other than electric heating rods may be used, and the heating installation may also be provided at still other places of the shaft, for example,

approximately in the center thereof. Furthermore, air shafts with heating installations may also be provided at several side walls of the sauna cabin, and the hot air may be supplied in any other suitable manner to the uppermost air layer below the ceiling even though the simple mounting of a wall cover at a distance from the outer wall permits the realization of the present invention in the most simple manner. Furthermore, the location of the opening for the circulating air re-entering the shaft provided with the heating installation may be arranged in any other suitable manner, for instance, may be located below a bench by way of a duct or the like extending at an angle to the side wall containing the shaft with the heating installation. Thus, it is obvious that the present invention is not limited to the details shown and described herein but is susceptible of numerous changes and modifications as known to those skilled in the art, and I therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. A sauna cabin including heating means for heating the air and outlet means for removing the cooled-off air within the area of the floor of the sauna cabin, characterized in that a shaft is provided at least on one side wall of the sauna cabin and having the heating means arranged therein, said shaft being provided with hot air aperture means immediately adjacent to the ceiling of the sauna cabin for discharging hot air into the sauna space of the cabin such that air of the highest temperature within the sauna space is only provided immediately adjacent the ceiling in the form of a layer which slowly settles to the floor of the sauna space as the layer cools, the air flow within the sauna space being in the downward direction, and the shaft being provided near the floor with at least one opening for the cooled-off air of the sauna space to be heated again with the air circulation within the cabin and removal of the cooled air from the cabin occurring only by convection flow in a nonturbulent manner such that the protective layer surrounding the body of an occupant is not disturbed.

2. A sauna cabin having nonturbulent air circulation including heating means for heating the air and outlet means for removing the cooled-off air within the area of the floor of the sauna cabin, characterized in that a shaft is provided at least on one side wall of the sauna cabin and having the heating means arranged therein, said shaft being provided with hot air aperture means immediately adjacent to the ceiling of the sauna cabin for discharging hot air into the sauna space of the cabin at the ceiling thereof such that a layer of high temperature air is provided at the ceiling which slowly settles to the floor of the sauna space as the layer cools to form a nonturbulent downwardly directed air flow within the sauna space, and the shaft being provided near the floor with at least one opening for the cooled-off air of the sauna space to be heated again, the air circulation within the cabin and removal of the cooled air from the cabin occurring only by convection flow.

3. A sauna cabin according to claim 1, characterized in that the shaft extends substantially over the entire width of the side wall of the cabin.

4. A sauna cabin according to claim 1, characterized in that the shaft is provided with a fresh air inlet means.

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5. A sauna cabin according to claim 4, characterized in that the fresh air inlet means is arranged within the area of the lower end of the shaft.

6. A sauna cabin according to claim 4, characterized in that a cooled-off air discharge aperture means is provided in the wall disposed substantially opposite the hot air discharge aperture means and within the lower area thereof.

7. A sauna cabin according to claim 6, characterized in that said cooled-off air discharge aperture means is adjustable.

8. A sauna cabin according to claim 6, characterized in that the shaft is formed by a partition in the form of a wood paneling, mounted at a small distance from the outer wall of the sauna cabin.

9. A sauna cabin according to claim 8, characterized in that the shaft is provided within the area of the heating means with a high temperature-resistant lining.

10. A sauna cabin according to claim 9, characterized in that the heating means is arranged at the upper end of the shaft.

11. A sauna cabin according to claim 9, characterized in that the heating means is arranged in the lower third of the shaft.

12. A sauna cabin according to claim 9, characterized in that an evaporating means for water is arranged above the heating means.

13. A sauna cabin according to claim 12, characterized in that an evaporating pipe is arranged above the heating means which is provided with water vapor discharge apertures.

14. A sauna cabin according to claim 12, characterized in that the evaporating means is constructed as dish arranged above the heating means in which terminates a pipe of a funnel disposed in the sauna space which extends through the partition wall.

15. A sauna cabin according to claim 14, charac-

terized in that the fresh air inlet means is arranged within the area of the lower end of the shaft.

16. A sauna cabin according to claim 2, characterized in that a cooled-off air discharge aperture means is provided in the wall disposed substantially opposite the hot air discharge aperture means and within the lower area thereof.

17. A sauna cabin according to claim 16, characterized in that said cooled-off air discharge aperture means is adjustable.

18. A sauna cabin according to claim 1, characterized in that the shaft is formed by a partition wall in the form of a wood paneling mounted at a small distance from the outer wall of the sauna cabin.

19. A sauna cabin according to claim 18, characterized in that the shaft is provided within the area of the heating means with a high temperature-resistant lining.

20. A sauna cabin according to claim 1, characterized in that the heating means is arranged at the upper end of the shaft.

21. A sauna cabin according to claim 1, characterized in that the heating means is arranged in the lower third of the shaft.

22. A sauna cabin according to claim 2, characterized in that an evaporating means for water is arranged above the heating means.

23. A sauna cabin according to claim 22, characterized, in that an evaporating pipe is arranged above the heating means which is provided with water vapor discharge apertures.

24. A sauna cabin according to claim 23, characterized in that the evaporating means is constructed as dish arranged above the heating means in which terminates a pipe of a funnel disposed in the sauna space which extends through the partition wall.

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