March 14, 1967 SVEN-OLOF JANSSON 3,309,501

ELECTRIC STEAM BATH HEATER

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Fig.2

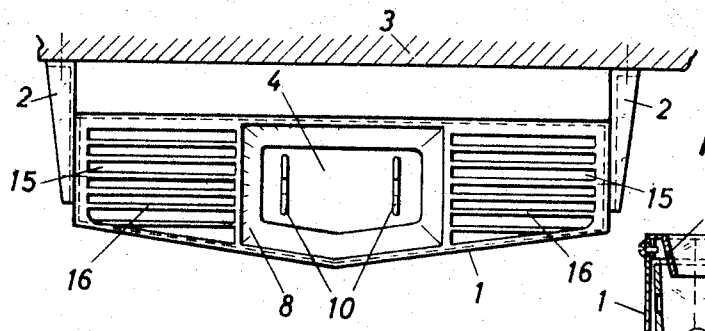
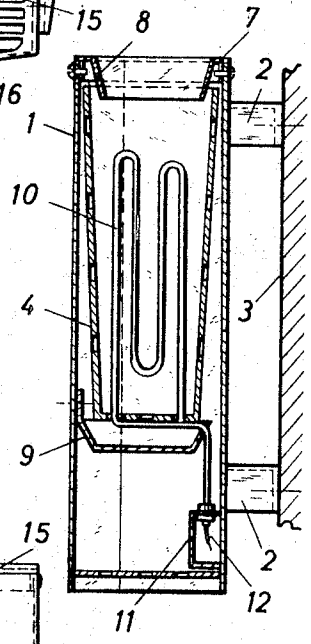


Fig.3



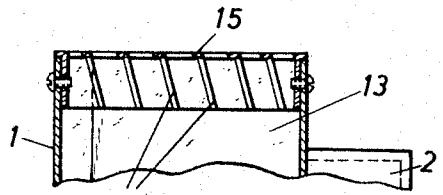


Fig.4

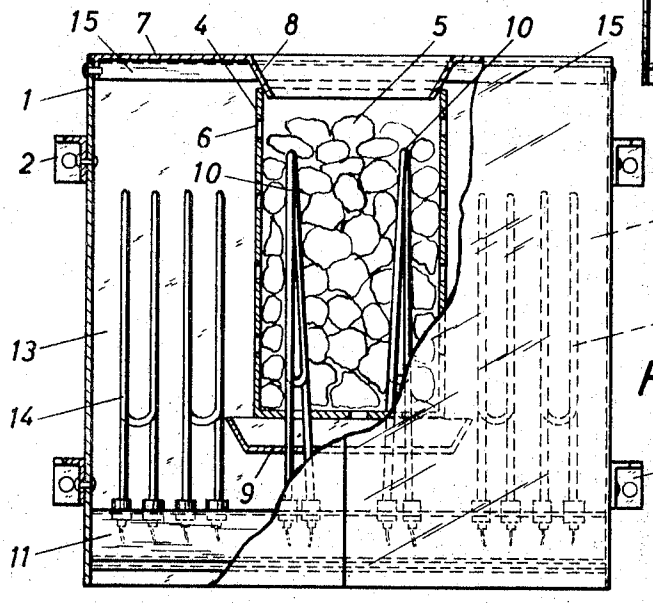


Fig.1

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Fig. 5

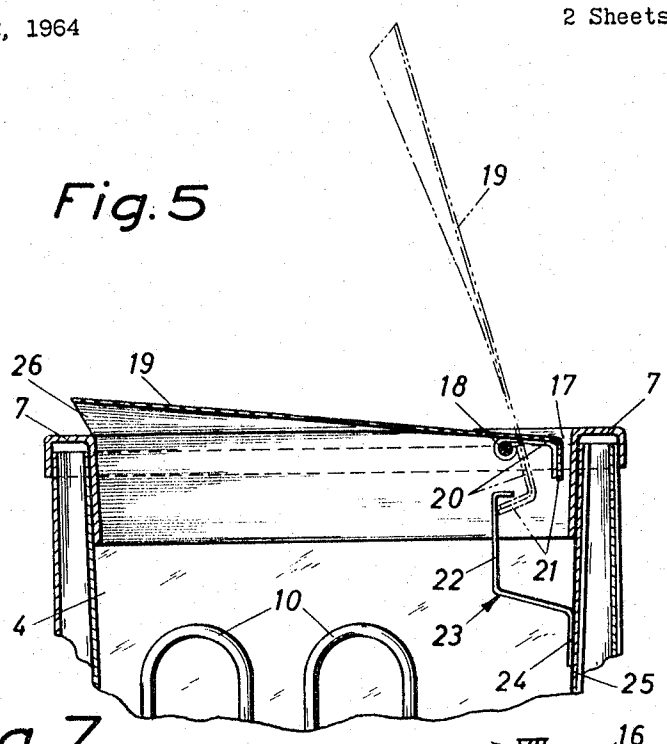


Fig. 7

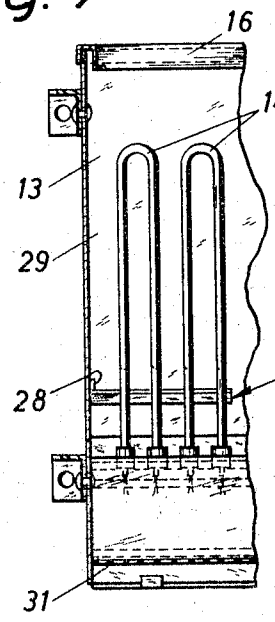
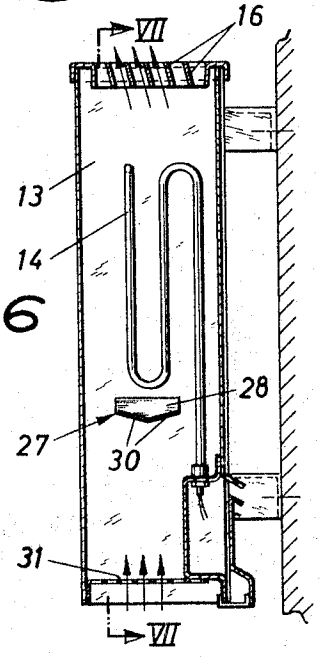


Fig. 6



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United States Patent Office 3,309,501
Patented Mar. 14, 1967

3,309,501

ELECTRIC STEAM BATH HEATER

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Filed June 22, 1964, Ser. No. 376,744
Claims priority, application Sweden, July 16, 1963, 7,867/63; May 26, 1964, 6,352/64
1 Claim. (Cl. 219—367)

This invention has reference to steam bath heaters of the kind provided with a heat storing means comprising stones or similar bodies for accumulation of heat and means to heat these bodies and the air in and around the heater.

In earlier known heaters the stone storing means is heated electrically by means of electrical resistances below the storing means, said resistances adapted to be connected to a source of electrical energy. The air heated below the storing means streams up through the bottom of the heat storing means and thus heats the stones. According to another known construction a fan is arranged in the heater for blowing air, heated by means of the heating elements, from below and also from the side into the storing means so that the stones in said storing means are heated a little more effectively. Without any fan it is possible to heat the stones to a temperature of about 200° C. When the hot air by means of a fan is forced in between the stones the temperature of the stones can be brought to about 300° C. The heating time in both cases is about 30 minutes. When water is poured over the hot stones so as to produce steam, the stones are rapidly cooled down to a temperature of about 100° C. and then the formation of steam ceases. A lowering of the temperature from e.g. 200° C. is carried out rather fast and many a time the steam quantity will not be enough for a bath.

The purpose of the present invention is to make it possible to produce a considerably greater quantity of steam at the same consumption of electricity. The main feature of the invention is to arrange a number of resistance elements in the storing means, which are adapted to be connected to a source of electric energy, said elements being completely enclosed in tubes, in such a way that the tubes are in direct contact with the bodies in the storing means. No fan is necessary. The steam bath heater can be manufactured in the shape of a parallelepipedon and thereby the space requirements will be very small and the heater can easily be hung on a wall in the steam bath room.

According to a preferred embodiment of the invention there are arranged on either side of the storing means chambers in which there are arranged electrical resistances adapted to be connected to a source of electrical energy. Above the chambers there are arranged lattices with bars which are adapted to direct the air streams heated in the chambers obliquely into the steam bath chamber. Hereby there is obtained a more even temperature in the steam bath room and there is prevented too high a heating of the roof in the same and of the wall on which the heater is arranged.

However, everybody does not like steam baths but some prefer dry hot air. In this case no water is poured over the heater. Thus, stones are not needed in the storing container. However, when the tubes in the storing container are not surrounded by stones the heat emission from the tubes will be so great that there is a risk that the ceiling be overheated and set on fire. According to one embodiment of the invention the storing container is provided with a swingable flap adapted after swinging up automatically to return to a position covering the upper end of the container. This flap, which with advantage is shaped in such a way that the hot air stream from

the storing container is directed obliquely forwards upwards, prevents direct streams from hitting the ceiling in the steam bath room.

The chambers on either side of the storing container are at their lower ends provided with a lattice allowing the entrance of air to the chambers. As the heater for practical reasons is arranged at a rather short distance from the floor of the bath room there occurs a certain risk that the floor by heat emission from heating tubes in the chamber be overheated and set on fire. According to one embodiment of the invention there is, for the elimination of this risk, below the tubes in each side chamber arranged a deflector which is essentially horizontal and is arranged to direct the heat beams from the tubes upwards. Thereby the lattice at the lower part of the chambers will not be heated to any notable degree but the lattice at the upper portion of the chambers will reach a considerably higher temperature. Due to this difference in temperature at the lower and upper portions of the side chambers there is obtained a very good chimney effect causing a very strong stream of air through the chambers. Thus, the result will be a very good heating effect.

The invention will now be elucidated with reference to the accompanying drawings. In the drawings:

FIG. 1 shows a partially and longitudinally sectioned front elevation of a steam bath heater according to the invention,

FIG. 2 shows a plan view of the same,

FIG. 3 shows a vertical cross section through the heater,

FIG. 4 shows on an enlarged scale a cross section through the lattice above one of the heating chambers,

FIG. 5 shows on a still larger scale a vertical cross section through the upper portion of the storing container of the heater,

FIG. 6 shows on a reduced scale a vertical cross section through one of the side chambers, and

FIG. 7 shows a vertical longitudinal section on the line VII—VII in FIG. 6 through the left hand portion of the heater.

Referring now to the drawings, the heater is manufactured in the form of a cabinet **1** with brackets **2** for its arrangement on a wall **3**. In the cabinet there is arranged a container **4** serving as a storing means for a number of stones **5**. Below the container **4**, i.e. the stone storing means, there is arranged a bowl **9** for gathering an excess of water. Up into the container there extend resistance elements completely enclosed in tubes **10**, the stones being in contact with said tubes **10**. The ends of the tubes **10** are arranged in a coupling box **11** in which the wires of the resistance elements can be connected to a source of electrical energy. On either side of the container **4** there are in the cabinet **1** arranged chambers **13** into which there extend similar resistance elements completely enclosed in tubes **14**. Also these tubes **14** have their ends in the coupling box **11**. The cover **7** is above the chambers **13** provided with a lattice **15**. The rods **16** of the lattice are inclined and they direct the air streams heated by the heating elements obliquely upwards into the heating room, i.e. away from the wall **3**.

Due to the contact between the stones **5** and the hot heating elements **10** in the container **4** there is obtained a temperature of 420–500° C. of the stones after only 15 minutes' heating. When water is poured over the stones there is obtained a strong production of steam and the steam quantity will be considerable due to the high initial temperature. The tubes **10** which preferably comprise a stainless material are very resistant and can withstand considerable stresses. When the container **4** is shaped with perforated sides, the stones **5** are heated also by means of heat emission from the heating elements **14** in the tubes in the chambers **13**.

The walls of the container 4 may be shaped with inclining lattice rods in such a way that water pouring along these rods does not leave the container 4. Any water in excess can, however, be gathered in the bowl 9. The volume of the stone container is preferably given such a size that about 35 kilograms of stone can be housed in the container 4. However, it is also possible to use other heat storing bodies in the container.

The lid 7 covering the whole heater is, according to the embodiment shown in FIG. 5, close to the rear upper edge of the storing container 4 provided with a horizontal shaft 18, a flap 19 being swingable about this shaft 18, said flap 19 in swung down position covering the store container 4. The flap is on its under side provided with sheet strips 20 with loops enclosing the shaft 18 and serving as bearings. The sheet strips 20 are preferably spot welded to the flap 19. The flap 19 is at its rear border provided with a downwardly bent flange 21 which is dimensioned in such a way that it at the swinging up of the flap 19 (see the position indicated with dash and dot lines in FIG. 5) abuts against the upper free branch 22 of a Z-shaped disk spring 23 which with its lower branch 24 is attached, e.g. by means of spot welding, to the rear wall 25 of the container 4. The flap 19 is—seen from the front side (i.e. from the left according to FIG. 5)—roof-shaped in such a way that an air stream opening 26 is formed at the front edge of the flap. By means of this device it is ensured that the flap 19, if it for any reason has been swung up will by the action of the spring 23, and—due to the special balancing of the flap (see FIG. 5)—by gravity automatically returns to the closing position. Any risk for the emitted heat from the resistance element tubes 10 to heat the ceiling of the bath room to a temperature that is too high does not exist.

As obvious from FIGS. 6 and 7 there engages below the tubes 14 containing the resistance elements a deflector 27 which at one end is provided with an attachment flange 28 by means of which the deflector 27 is attached to the gable wall 29 of the heater. The deflector which preferably is manufactured from bare sheets, is groove-shaped with walls 30 diverging upwards. These walls deflect the heat emission from the tubes 14 and direct it towards the lattice 16 above the side chambers 13. This lattice is hereby heated to a high temperature. On the other hand the lattice 31 which permits the air to flow into the chamber 13 at the lower end of the same, is heated only very little. The temperature difference of the lattices 31 and 16 gives a high speed of the air stream through the chambers 13.

The shown and described embodiments are to be regarded only as examples and the steam bath heater may be constructively modified in many ways within the scope of the appended claim. Thus, the cabinet 1 and the tubes 10 and 14 could be given another shape than the one shown in the drawings. The same thing is true also for the bearing of the flap 19 and the device for its automatic return to closing position.

What I claim is:

A steam bath heater for a steam bath room comprising a housing having an opening in its top wall, a container filled with heat receiving and retaining bodies for storing heat having an open upper end in said housing, means for heating said bodies and the air in and around said housing, said heating means comprising a plurality of resistance elements in said container adapted to be connected to a source of electric energy, tubes completely enclosing said elements projecting into said container and in direct contact with said bodies in said container, said container being positioned in spaced relation to the end walls of said housing so as to form an air heating chamber located at each side of said container in said housing, each of said chambers having an air inlet means at its lower end located at each side of said container in said housing, said heating means also comprising resistance elements located in each chamber adapted to be connected to said source of electric energy, tubes enclosing said resistance elements in each chamber projecting into each chamber, a lattice arranged above each chamber in said housing forming an air outlet, rods in each lattice to direct the air streams heated in each chamber away from the side of said housing which is adjacent a wall of said room, said container having a hinged flap with its front edge spaced above the top of said container to form an air outlet, means for returning said flap when raised automatically to a position covering the upper end of said container, a horizontal shaft extending along the rear wall of said container on which said flap is journalled, said means for returning said flap including a Z-shaped disk spring attached to the rear wall of said container cooperating with said flap, a horizontal deflector located below said tubes containing said resistance elements in each chamber adapted to direct the heat emission from said tubes upwardly, said deflector being shaped as a groove with walls diverging in the upward direction.

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