

Aug. 12, 1958

J. B. SCHMITT ET AL
ELECTRIC STEAM VAPORIZER

2,847,549

Filed May 6, 1957

3 Sheets-Sheet 1

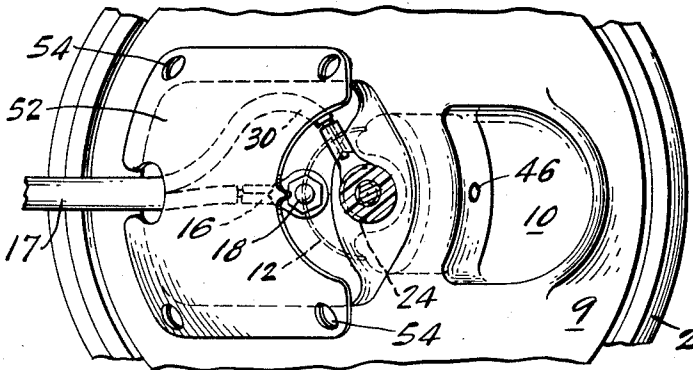


FIG. 2-

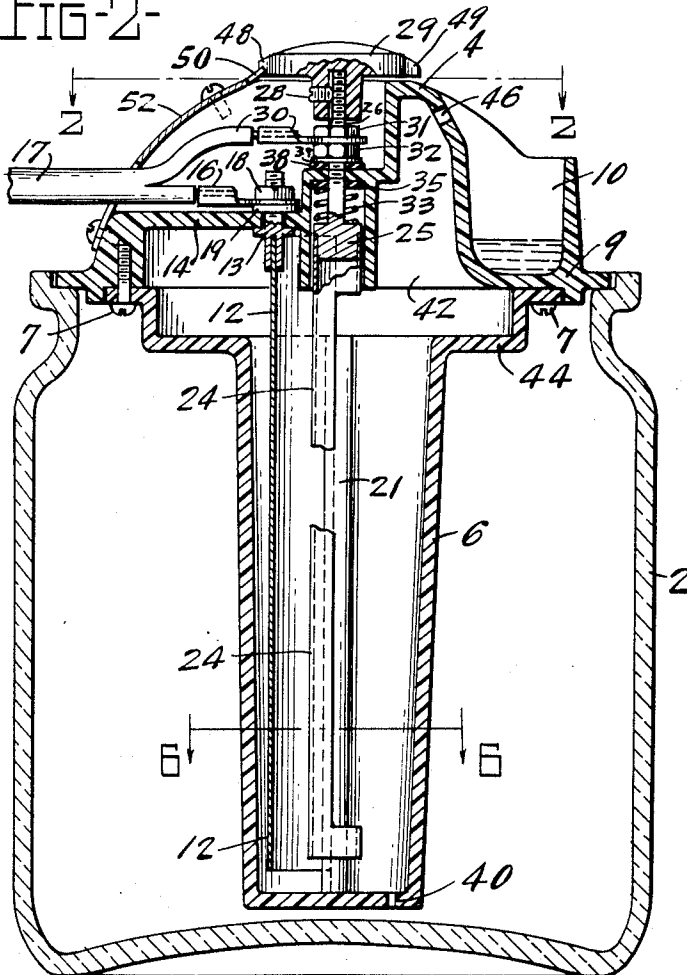


FIG. 1-

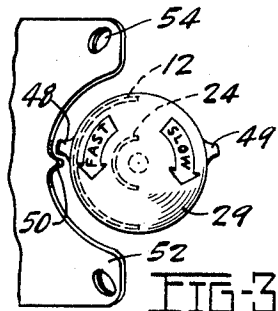


FIG. 3-

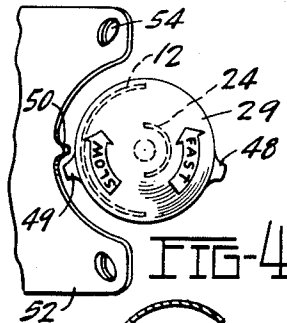


FIG. 4-

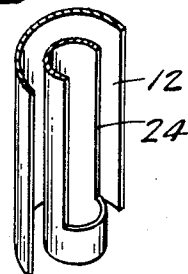


FIG. 5-

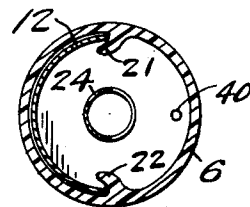


FIG. 6-

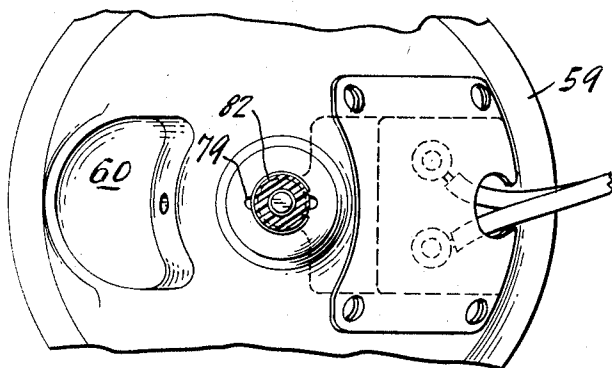
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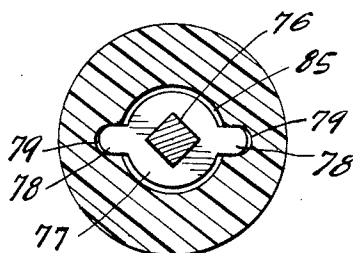


FIG-9-

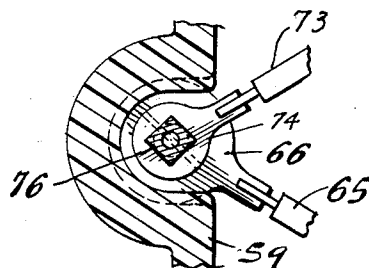


FIG-10-

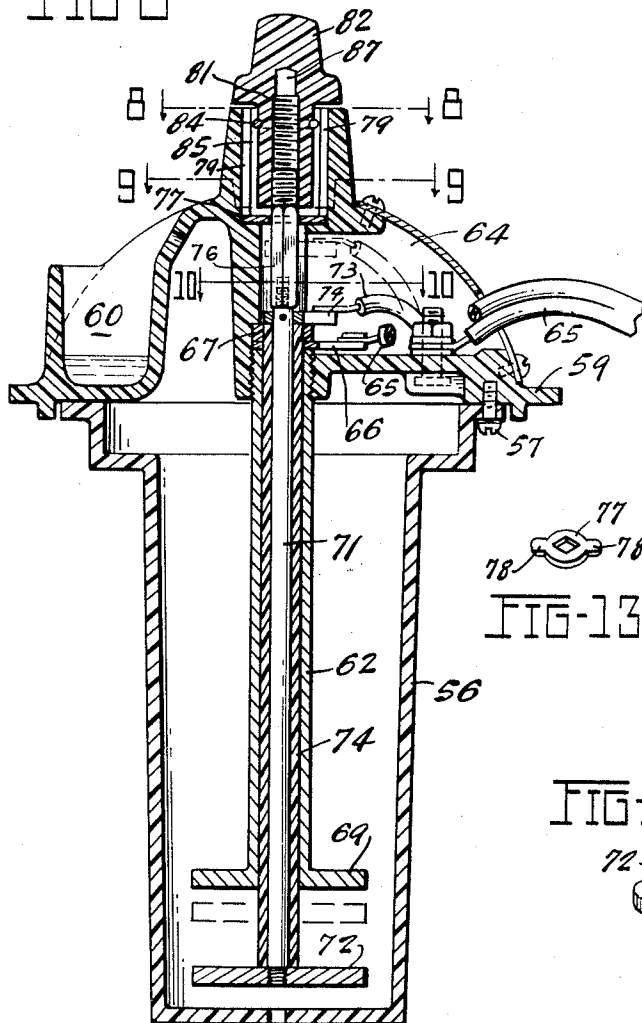


FIG - 7 -

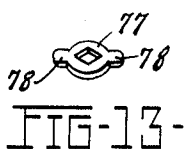


FIG-13-

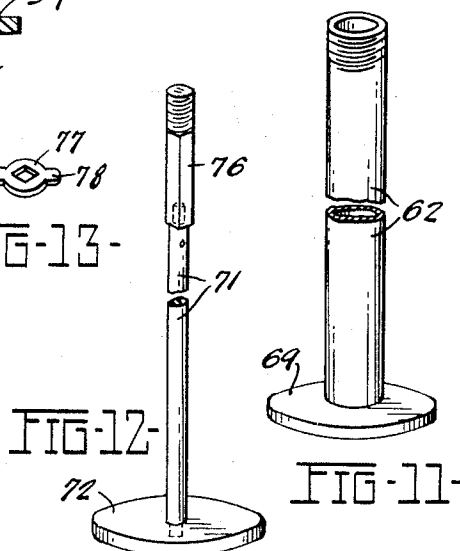


FIG-12-

FIG-11-

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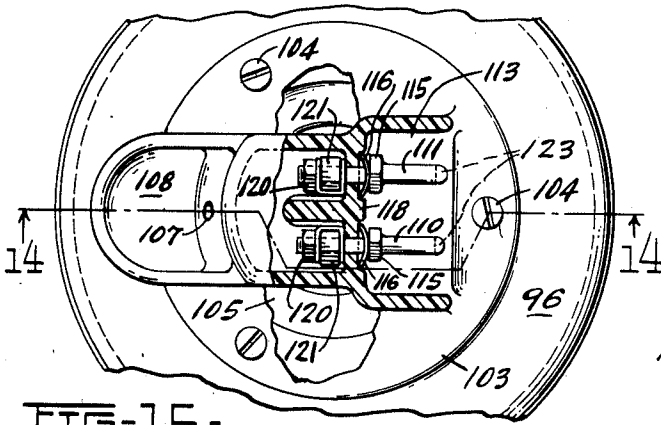


FIG-15-

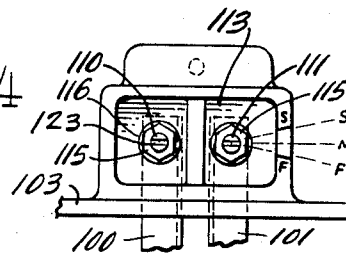


FIG-16-

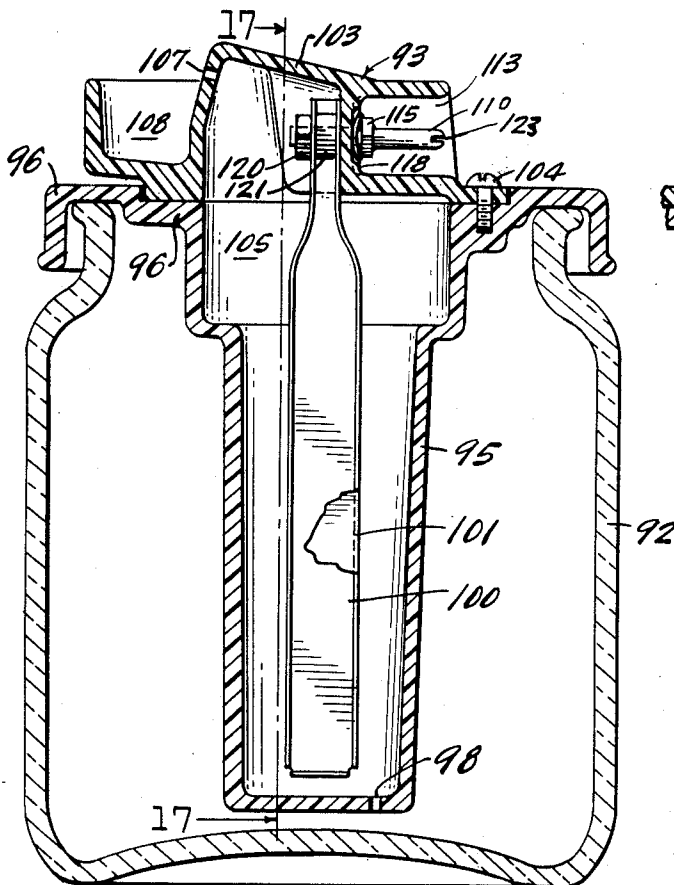


FIG-14-

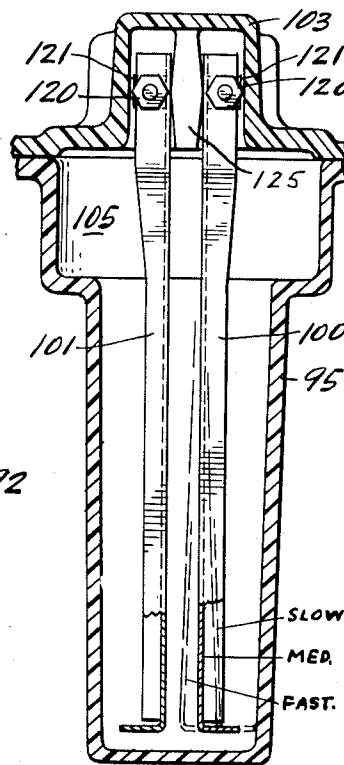


FIG-17-

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ELECTRIC STEAM VAPORIZER

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corporation of Ohio

Application May 6, 1957, Serial No. 657,236

7 Claims. (Cl. 219—40)

This invention relates to vaporizers for heating or vaporizing water or other liquids, usually in conjunction with a medicinal agent. More particularly, this invention relates to such an instrument in which heat is generated by the passage of an electrical current between spaced electrodes submerged in the liquid.

Vaporizers of this type are usually employed to produce steam, carrying volatilized medicinal substances, for inhalation by persons suffering from respiratory ailments. Frequently, however, steam from these vaporizers without an additive agent is used effectively in such treatment.

In the conventional design of these vaporizers there is a comparatively large container for the water to be vaporized, and a small receptacle for a special therapeutic agent, such as tincture of benzoin.

The principal factors affecting the rate of electrical flow and the proportionally related heat or steam production, are the area and spacing of the electrodes, and the electrolytic properties of the water.

The shape and positioning of the electrodes are under the control of the manufacturer, and are selected to give the most desirable rate of steam discharge with water of an average mineral content supplemented by a pinch of table salt. The results attained through this practice have proved generally satisfactory. However, in view of the range in hardness of water throughout this country and elsewhere, there is a difference in performance of the vaporizers in various localities. Where the water is unusually soft, the steam production would be very poor without the addition of extra salt. In other areas the supply of water is of severe hardness with a content of mineral salts permitting too high a current flow and causing a turbulent boiling action.

This lack of uniformity in performance is, of course, very objectionable in the extreme cases and is undesirable in many situations where a particular steam discharge rate would be preferred for treating a certain ailment or personally favored by the patient.

The principal object of this invention is to provide a vaporizer with means by which the user may control the rate of steam production independently of the character of the water.

It is a further object of the invention to provide a vaporizer with which the rate of steam discharge may be easily and quickly altered.

These and other objects and advantages of the invention are attained by novel mounting arrangements of the electrodes through which the effective area of the electrodes or the distance between them may be varied as desired.

In the drawings,

Figure 1 is a vertical section of a vaporizer embodying one form of the invention;

Figure 2 is a broken plan view of the vaporizer of Figure 1;

Figure 3 shows the electrode positioning knob of the

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vaporizer illustrated in the two preceding views adjusted for maximum steam generation;

Figure 4 shows the knob turned to the setting for the lowest steam generation;

Figure 5 is a broken perspective view of the lower ends of the electrodes of the vaporizer of Figures 1 and 2;

Figure 6 is a horizontal section taken on the line 6—6 of Figure 1 through the electrodes and the electrode casing;

Figure 7 is a vertical section of a vaporizer embodying another form of the invention;

Figure 8 is a broken plan view of the vaporizer of Figure 7 with a portion in section taken on the line 8—8 of Figure 7;

Figure 9 is a sectional view taken on the line 9—9 of Figure 7;

Figure 10 is a broken section taken on the line 10—10 of Figure 7;

Figure 11 is a perspective illustration of the outer electrode of the vaporizer of Figure 7;

Figure 12 is a like view of the inner electrode;

Figure 13 is a perspective view of the square-ported washer which prevents the inner electrode from turning;

Figure 14 is a vertical section of another vaporizer embodying a third form of the invention;

Figure 15 is a broken plan view and horizontal section of the vaporizer of Figure 14;

Figure 16 is a side elevation of the upper end of the vaporizer of Figures 14 and 15; and

Figure 17 is a vertical section through the electrode casing of the vaporizer of Figure 14 in a plane normal to the plane of the section of Figure 14.

Referring to the drawings in more detail, the vaporizer of Figure 1 has a water jar or container 2 with its neck portion shouldered to support the vaporized head assembly 4. A depending electrode casing 6 is secured by bolts 7 to the underside of the head assembly 4.

The main body 9 of the head assembly is molded to form an open-topped medicament receptacle 10. An outer electrode 12 of arcuate section is suspended within casing 6 by a hanger stud 13 passing through the upper wall 14 of the main body 9. A terminal wire 16 of the electrical cord 17 is secured to the stud 13 between nut 18 and sealing washer 19.

The electrode 12 is held rigidly in place within casing 6 by vertical ribs 21 and 22 which are angularly inclined over the vertical edges of the electrode, as illustrated in Figure 6.

An inner electrode 24 is semicylindrical throughout its main portion with integral strengthening bands at its extremities. The upper end of electrode 24 is fixed to the enlarged lower end 25 of the rotatable rod 26. Held to the upper end of rod 26 by a set screw 28 is the hand knob 29.

The second terminal wire 30 of the electrical supply cord 17 is secured to rod 26 between nuts 31 and 32. A spring 33 inclined between washer 35 and the upper side of the enlarged end 25 of rod 26 frictionally holds the electrode assembly in its selected rotated position. The spring 33 also through its downward pull keeps sealing disc 38 in place beneath washer 39.

Other structural features of this vaporizer will be referred to in the following explanation of its operation.

Water is first placed in container 2 and a pinch of salt may be added thereto according to standard recommendations; the head assembly 4 is positioned over the container, and tincture of benzoin or some other medicinal preparation may be introduced into receptacle 10. Then, with cord 17 attached to an electrical source, current will start flowing between the electrodes, and its passage through the intervening water brings the water within electrode casing 6 to a boiling temperature.

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With electrode 24 turned as shown in Figures 1, 3, 5 and 6, the full outer surface thereof is placed a minimum distance from electrode 12, and the flow of electricity between the electrodes is accordingly at a maximum steam generating rate. As the formation of steam depletes the water in casing 6, a replenishing supply arrives through port 40 in the bottom of the casing from container 4.

The steam from casing 6 enters steam chamber 42 formed between the flanged upper end 44 of the casing and the body 9. The steam is discharged from chamber 42 through outlet port 46 and draws upwardly into confluence medicinal vapor rising from receptacle 10. The medicament in the receptacle is slowly volatilized by heat reaching it through the wall of the steam chamber.

Should the natural mineral content of the water be unusually high and result in a heavy flow of electricity between the electrodes, a violent boiling action will occur. This will cause a dangerous overflow and projection of splattering hot water from discharge port 46.

In such an event the current flow and the accompanying heat generation may be reduced by turning the hand knob 29 clockwise from the position of Figure 3 toward the slow position of Figure 4.

By so doing the inner electrode 24 is swung around its axis of rotation until in its extreme position it faces away from the outer electrode 12 as indicated by the dotted section lines of the electrodes of Figure 4.

From the start of the rotary movement of the inner electrode 24 from the high speed setting of Figure 3 progressively more of the semicylindrical surface of this electrode moves away from direct facing relation with the coaxial inner curved surface of outer electrode 12. This, in effect, keeps reducing the functioning areas of both electrodes and gradually cuts down the current flow and the production of steam. Adjusting the electrode positioning to the slowest setting may not be necessary as an intermediate point is likely to provide the desired rate of steam discharge.

In the same manner, rather soft water may be compensated for by turning the electrode 24 toward the fast position indicated on the knob 29. The latter is limited to a rotation of 180° by the alternate abutting of its fingers 48 and 49 against the stop 50, which is a projection from the edge of the cover plate 52. This plate lays over the space where the terminal wires are connected to the electrodes and is secured to the main body member 9 by bolts 54. The terminal wire 30 has sufficient length to swing freely with the reciprocation of rod 26, to which it is fastened.

Besides adapting the operation of the vaporizer to different types of water, the electrode adjustment may, of course, be utilized to vary the steam discharge to suit the needs or desires of the patient.

The vaporizer of Figure 8 is an embodiment of the invention in which one of the electrodes is mounted for slidable, instead of rotary, movement, with the coating portions of the electrodes vertically spaced.

It has been found that the surfaces of electrodes are kept cleaner of precipitants when one is above the other. This is believed to be due to bubbles of steam rising from the lower electrode.

The electrode casing 56 of this vaporizer is held by bolts 57 to the main head member 59. The latter is shaped to form a medicinal receptacle 60.

The outer electrode 62, of generally tubular form, is supported through threaded engagement with body member 59. The upper end of electrode 62 extends slightly into chamber 64 where it is connected to terminal wire 65 through contact ring 66, which is held against the upper end of the electrode beneath the insulating washer 67. The current discharge portion of electrode 62 comprises the outwardly extending flange 69 at its lower end.

The inner electrode 71 of generally rod form has a

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lower exposed disc part 72 below and in opposed current-exchanging relation to the flange 69 of outer electrode 62.

The rod-like electrode 71 passes upwardly axially within tubular electrode 62, and is insulated therefrom by the rubber (or plastic) sleeve 74 which is tightly cemented to electrode 71.

The lead wire 73 is connected to electrode 71 through ring 74 which is pinned thereto. Ring 74 limits the permissible downward movement of electrode 71 by abutment against insulation washer 67.

To prevent turning of electrode 71, it is provided with a square cross section at 76, which guidedly passes through the square hole of washer 77. The latter is locked in position by the extension of its outer tongues 78 into notches 79 formed in the body member.

At its upper end electrode 71 has threaded engagement with the long threaded bore 81 of hand knob 82. A split ring 84 fitting in opposed grooves in the cylindrical bore 85 in the body member and around the knob 82 permits the knob to be turned while holding it against vertical axial movement. Accordingly, rotation of the knob 82 clockwise, as viewed from above the vaporizer, will draw the electrode upwardly through its engagement with the threaded bore 81 within the knob. This upward movement may be continued until the upper end of the electrode reaches and is stopped by the unthreaded extension 87 of bore 81. At this point the lower disc 72 of the electrode will reach the position indicated by dotted lines in Figure 7.

As may be perceived, this arrangement of electrodes enables the spacing between their functioning portions to be varied at will to give the proper vaporizing volume, whatever the composition of the water. The steam discharge may be altered, as well, to suit the wishes of the user.

It may be noted that in this embodiment the effective areas of the electrodes remain the same while the spacing between them is the controlled element.

The vaporizer illustrated in Figure 14 is changed little from a conventional structure by the addition of features of this invention. It has the usual water jar 92 surmounted by the main vaporizer assembly 93. In this case the electrode casing 95 has a broader, flanged portion 96 which lays over the edge of the jar to support the assembly thereon.

The casing 95 is ported at 98 for the entry of water. The two electrodes 100 and 101 depend in a generally parallel relation from the head member 103, which is held by bolts 104 to the casing 95.

Steam arising from the casing enters the steam chamber 105, formed by opposed hollow portions of the casing and head member, and then is discharged through outlet 107 over the medicinal receptacle 108.

A pair of terminal posts 110 and 111 project toward the open side of exterior chamber 113 for the reception of the attachment plug of an electrical cord. The posts have flanges at 115 to receive the thrust of spring washers 116 which are held between the flanges and the vertical wall 118 of the head member.

The inner ends of the terminal posts extend through wall 118 and are threaded to receive two nuts 120 and 121, between each pair of which, an electrode is tightly fixed to one of the posts.

The outer ends of the posts are notched at 123 by which they may be turned slightly by a screwdriver or by a thin edged article such as a coin. The turning of a post swings the electrode with which it is connected in a short arc limited in range by abutment of the side of the electrode with the web 125 lying between the electrodes as shown in Figure 17.

While both electrodes may be so rockably mounted, it is preferred and considered simpler and sufficient to have one only subject to movement. As indicated in Figure 16 markings indicating which way to turn the

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single electrode for slower or faster steam generation may be placed on the edge of the open side of chamber 113. Turning the post associated with electrode 100 clockwise will swing this electrode farther away from electrode 101 and counterclockwise nearer as shown in Figure 17.

In this instance the flat, facing, effective areas of the electrodes remain the same and the distance between them altered to change the rate of steam production.

It will be apparent that various modifications and changes may be made in the three preferred forms of this invention, which were selected for illustration, without departing from the scope of the invention as delineated by the following claims.

We claim:

1. An electric steam vaporizer for the treatment of respiratory ailments including a water container, a head assembly mounted on the container, a pair of steam generating electrodes suspended in spaced relation in the container from the head assembly, a vertically elongated casing depending from the head assembly and enclosing the pair of electrodes, said casing being ported at its lower end for the entry of water from the container, means forming a steam chamber in the head assembly above and in communication with the casing, there being a steam discharge orifice providing an outlet to the atmosphere for steam from said chamber, an open topped receptacle for volatile medicaments on the exterior of the head assembly and positioned adjacent and below the path of steam issuing from the discharge orifice, a mounting within the head assembly for one of the electrodes permitting movement of the said electrode relative to the other electrode, and a rotatable element in the head assembly for actuating the movement of said electrode.

2. An electric steam vaporizer according to claim 1

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in which the said other electrode is held in a fixed position, and vertically extending flange means projecting inwardly from the wall of the casing confine the said other electrode within a certain vertical section of the casing.

3. An electric steam vaporizer according to claim 1 in which major portions of the electrodes are coaxially cylindrical with the cylindrical form of the movably mounted electrode, having a radius of considerably less length than the radius of the cylindrical form of the other electrode.

4. An electric steam vaporizer according to claim 3 in which the electrodes are both semi-cylindrical for the major portion of their length, and the movably mounted electrode is rotatable about the axis of said cylindrical form.

5. An electric steam vaporizer according to claim 1 in which the movable electrode is vertically reciprocable, the other electrode has a hollow cylindrical form, and the movable electrode is suspended down through the hollow interior of the other electrode.

6. An electric steam vaporizer according to claim 1 in which the electrodes are generally flat, vertical strips in parallel arrangement.

7. An electric steam vaporizer according to claim 6 in which there is a pivotal mounting in the head assembly for one of the electrodes upon which it may be swung laterally.

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