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STEAMING APPARATUS FOR PERMANENT HAIR WAVING

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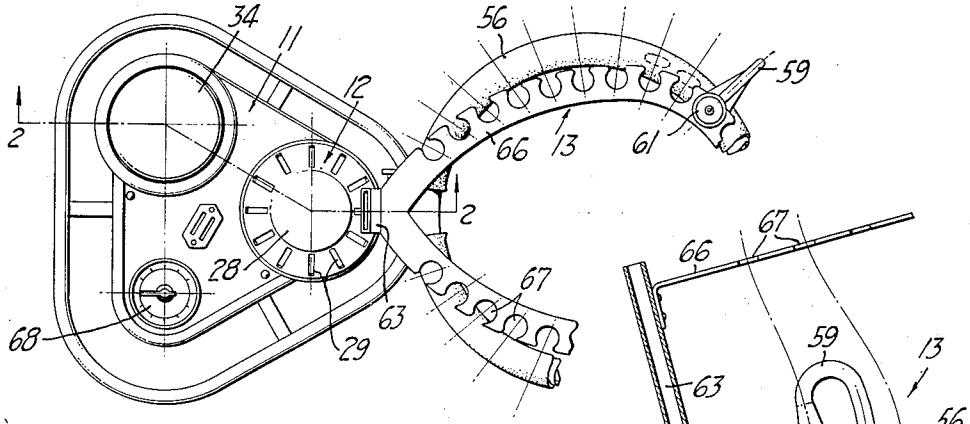


FIG. 1.

FIG. 2.

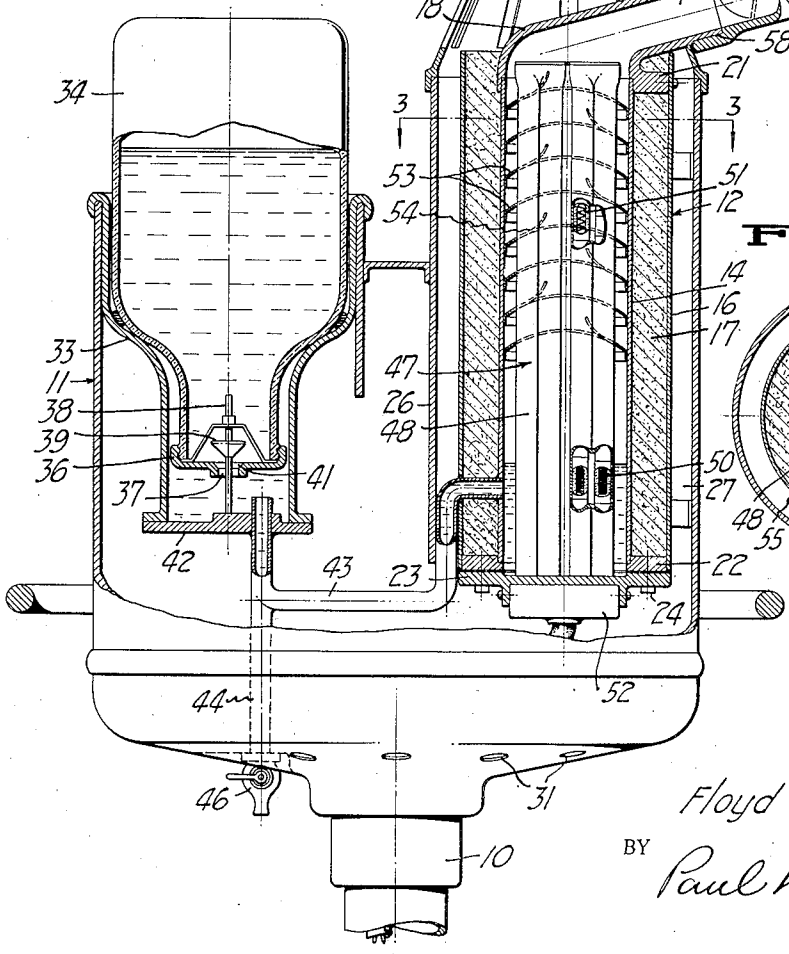
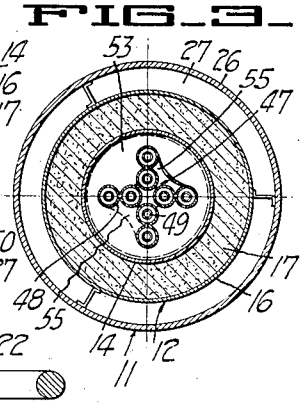


FIG. 3.



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STEAMING APPARATUS FOR PERMANENT HAIR WAVING

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5 Claims. (Cl. 219—38)

This invention relates generally to machines for use in the permanent waving of hair, and particularly to machines of the type which generate steam in a vaporizer and then conduct the steam to hair waving appliances.

It is an object of the invention to provide a machine of the above character which will be simple and reliable in operation, and which will provide a relatively dry superheated steam at a pressure near atmospheric.

A further object of the invention is to provide novel heating means both for the purpose of vaporizing water and for the purpose of superheating the steam.

Another object of the invention is to provide a machine of the above character in which the manifolding for effecting proper distribution of steam to various appliances is removable from the boiler or vaporizer as a unit, together with other parts.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a plan view, illustrating a machine incorporating the present invention.

Fig. 2 is a side elevational view, partly in cross-section, illustrating the machine of Fig. 1.

Fig. 3 is a cross-sectional detail taken along the line 3—3 of Fig. 2.

In general, the machine consists of a portable stand 10 or like support, which carries a housing 11. The housing 11 carries a vaporizer or steam boiler 12, which in turn is in communication with the steam distribution unit 13.

Referring particularly to Fig. 2, the vaporizer 12 includes an elongated upright container 14, which can conveniently be in the form of a cylinder. It is desirable that this part be formed of non-corrodible metal, such as brass or bronze. Surrounding the container 14 there is a shell 16 of considerably larger diameter, and the space between the shell and the container can be filled with heat insulating material 17. At the top of container 14 there is a closure 18, formed to afford a laterally extending steam discharge opening 19. Lugs 21 may be provided on member 18, for attachment to the upper end of jacket 16. The lower ends of the container 14 and the jacket 16 are shown attached together by the annular member 22.

To serve as a closure for the lower end of container 14, there is a plate 23, which is removably secured to the annular member 22 by suitable means, such as cap screws 24. Plate 23 serves as a mounting for the lower ends of electrical heating elements, as will be presently explained.

The housing 11 is also formed to afford a jacket 26 which is considerably larger in diameter than the diameter of shell 16, thus affording a space 27 for convection currents of air. Cap 28, provided with perforations 29, is provided for the upper end of jacket 26. The lower end of this jacket is in communication with the interior of the remainder of housing 11, and this housing may be in communication with the atmosphere through opening 31. Thus, air from the atmosphere may flow upwardly through space 27, to prevent the walls of the housing and jacket 26 from being heated to an undue degree.

To automatically supply suitable quantities of water to the lower portion of container 14, means is provided as follows:—A receptacle 33 is provided alongside jacket 26 and serves to support an inverted water bottle 34. The mouth of this bottle is provided with a cap 36, which is apertured to form the water outlet 37. A slidable rod 38 extends through aperture 37 and serves to carry a valve member 39. A stationary valve seat 41 co-operates with valve member 39, whereby, when the bottle is removed with respect to receptacle 33, the outlet 37 is closed. For the operating position illustrated in Fig. 2, rod 38 engages with the lower wall 42 of receptacle 33, thus maintaining valve member 39 in open position. It will be evident that this valve arrangement facilitates introduction of a bottle of fresh water, after a bottle has been emptied of its contents. It will also be evident that when the bottle is inverted in the machine, as shown in Fig. 2, water will seek a level in receptacle 33 somewhat above the level of outlet 37, but that when water is removed from the lower portion of receptacle 33, to bring the water level in the same below the level of outlet 37, air from the atmosphere flowing upwardly through the outlet enables a supply of additional water from the bottle.

To provide communication between the lower portion of receptacle 33 and the lower portion of container 14, I utilize a substantially unobstructed tube 43. It will be noted that the point of communication of this tube with the container 14 is substantially above the bottom or lower end of this container, and below the level of outlet 37. A tube 44, controlled by a pet cock or like valve 46, can be provided for draining water from receptacle 33.

The heating means associated with the container 14 is preferably electrical and serves the dual purpose of vaporizing water and of effecting superheating of the same with the removal of any entrained moisture. Thus, plate 23 serves as a mounting for the lower ends of the elongated electrical heating elements 47, which may be grouped together as illustrated in Fig. 3. In construction, these elements may be similar to elements such as disclosed in Kercher et al. Patent No. 1,671,592, with an outer creased tube 48 and an inner coiled resistance conductor 49. The lower portions of each of the heating elements, which are normally immersed in water, have the convolutions of their coiled resistance conductors relatively close together, as indicated at 50. However, the upper portions of the elements extending above the normal water level have the convolutions of their resistance conductors spaced relatively far apart, as indicated at 51. By this arrangement, a proportionally greater amount of heat is provided per unit surface for those portions of the heating elements immersed in water, as compared with portions extending above the water level which serve to superheat the evolved steam. If the resistance conductors were uniform throughout the length of the heating element, the upper portions of the elements would be heated to too high a degree, with the result that the useful life of the elements would be materially shortened. The casing 52 below plate 23 carries electrical terminals, and also serves to house a thermostatic safety switch which is electrically connected in series with the heating elements. This switch is adjusted to trip when heated to an excessive degree, as for example when the vaporizing container runs dry.

In order to more effectively superheat evolved steam, and also to remove entrained particles of water, a plurality of vertically spaced baffles 53 are provided. These baffles can be made of good heat conducting material, such as brass, copper or bronze, and they are preferably inverted cup-shaped. They are secured to the tubes 48 of the heating elements by suitable means, such as electrical welding, and their outer peripheries are formed cylindrical to afford only a slight amount of clearance with respect to the inner surface of container 14. To afford a tortuous flow path for steam, each of the baffles is provided with an upwardly and outwardly bent tap portion 54, the bent tabs for successive baffles being staggered laterally to afford the staggered openings 55. It is evident that steam flowing upwardly through such openings is brought into intimate contact with the heated baffles 53, as well as with the outer surfaces of the heating elements 47, so that the steam is superheated to the desired degree, and so that any entrained drops of water are removed to secure the desired degree of dryness.

The distribution unit 13 is preferably constructed as follows:—A loop-shaped manifold conduit 56 is provided, which is in communication with a short conduit 57. The conduit 57 is provided with a slip coupling 58 for removable attachment with the steam discharge conduit 19. Flexible tubes 59 communicate at spaced points with the conduit 56, and the steam traps 61 on the free ends of these flexible tubes are adapted to have connection with hair waving appliances 62. The arrangement in this respect is similar to that disclosed in co-pending Keele application Serial No. 747,270, filed October 8, 1934. Secured to the conduit 57 and extending upwardly from the same, there is a conduit 63, the upper end of which is open to the atmosphere. By means of a manually operable flap valve 64, tube 63 can be opened to permit shunting of steam to the atmosphere. The upper end of tube 63 serves to afford a loop-shaped holding device 66, which is likewise similar to the holding device disclosed in said co-pending application Serial No. 747,270. This holding device is provided with slots 67, with which the free ends of tubes 59, carrying the steam traps 61, can be engaged.

It is of course evident that a suitable type of electrical control can be provided for the electrical circuit connected to the heating means. Thus, as indicated in Fig. 1, a time switch 68 can be provided in order to definitely limit the heating period to a predetermined interval of time. Likewise, a suitable switch can be provided for turning the current on or off, and a pilot light can be provided for indicating a period of operation.

Operation of the machine can now be briefly reviewed in entirety as follows:—Assuming that ample water is afforded in the bottle 34, water in receptacle 33 seeks a level somewhat above the level of outlet 37, and the water in vaporizing container 14 seeks a corresponding level. Before the machine is attached to hair waving appliances, the operator first closes the electrical circuit to the heating elements, and flap valve 64 is positioned to close the tube 63. Within a relatively short time the water in container 14 commences to boil, and the upward flow of evolved steam is superheated with removal of entrained droplets of water, so that relatively dry superheated steam is delivered through the discharge conduit 19. While the machine is warming up, the operator is preparing a head of hair for a waving operation. As explained in the aforementioned pending application Serial No. 747,270, the head of hair can be prepared by segregating the hair into flat strands upon which protectors are clamped, after which the individual strands are wound upon curlers which in turn are mounted upon the protectors. Assuming now that the machine is warmed sufficiently to permit a waving operation, tube 63 is temporarily opened, and flexible tubes 59 are attached to steam jackets, such as disclosed in Keele Patent No. 1,984,585. When such attachments have been completed, switch 68 is set in accordance with the duration desired for the steaming operation, and the valve 64 is turned to close tube 63 and discharge all of the steam into conduit 56. During such a steaming operation the pressure within the vaporizing container 14 may be slightly greater than atmospheric but not sufficient to force water back through the tube 43. As a matter of fact, if, during a steaming operation, the bottle 34 becomes empty, an ample amount of water will exist in the lower portion of container 14 to complete the steaming operation. Likewise if, during a steaming operation, some water in container 14 is forced back through tube 43, a sufficient amount of water will remain below the point of communication with tube 43 to continue the supply of steam. Thus, the simple manner afforded for supplying water to the vaporizing container 14, together with the fact that tube 43 communicates with the container at a point above the bottom of the same, makes it possible to eliminate complicated means for controlling induction of water, such as a float valve control mechanism, and at the same time affords an even feed of water and a uniform flow of steam.

I claim:

1. In a steaming apparatus of the character described, a vaporizing container, an inverted water reservoir having a lower water outlet, a receptacle surrounding said outlet and in communication with the atmosphere whereby water from the reservoir flows into said receptacle as air is admitted to the reservoir through said outlet, a heating element of substantially vertical extent associated with the container, means for conveying steam from the container to hair waving devices, and a substantially unobstructed tube connecting the receptacle with the container whereby water delivered to the container tends to seek a level corresponding to the level of water in the receptacle, the point of communication of said tube with said container being intermediate said level and the bottom of the container and also being intermediate the vertical extent of the heating element, the volumetric capacity of said container below said point of communication being sufficient to afford an amount of water which when vaporized near atmospheric pressure will provide sufficient steam for completing a hair waving operation.

2. In a steaming apparatus of the character described, an elongated upright vaporizing container, means for admitting water into the lower portion of the container, means for conducting steam from the upper portion of the container to hair waving appliances, an electrical heating element extending longitudinally through said container, the lower portion of said heating element being adapted to be immersed in water and the upper portion of the heating element extending above the water level, and a plurality of cup-shaped metal baffles carried by the upper portion of the heating element and adapted to be heated by the same.

3. In a steaming apparatus of the character described, a relatively upright and elongated vaporizing container, means for admitting water into the lower portion of said container, means communicating with the upper portion of said container for delivering steam to hair waving appliances, and heating means removable as a unit from said container, said heating means comprising elongated heating elements extending longitudinally through the interior of said container, the lower portion of said heating element being immersed in water and the upper portion of the heating element extending above the water level, and a plurality of vertically spaced metal baffles carried by the upper portion of said heating elements and adapted to be heated by the same, the outer peripheries of said baffles being in close proximity to the inner walls of the container.

4. In a steaming apparatus of the character described, an elongated upright vaporizing container, means for admitting water into the lower portion of the container, means communicating with the upper end of the container for delivering steam to hair waving appliances, and electric heating means associated with the container, said last mentioned heating means comprising a mounting forming the lower end of the container, a plurality of electrical heating elements extending upwardly from said mounting and longitudinally through the interior of the container, the lower portions of said electrical heating elements being immersed in water and the upper portions extending above the water level, and a plurality of vertically spaced metal baffles carried by the upper portions of said elements and adapted to be heated by the same, the peripheries of said baffles being in close proximity with the inner surfaces of the container, said baffles having laterally staggered openings for upflow of steam.

5. In a steaming apparatus of the character described, a relatively upright and elongated vaporizing container, means for admitting water into the lower portion of said container, means communicating with the upper portion of said container for delivering steam to hair waving appliances, and heating means removable as a unit from said container, said heating means comprising an elongated heating element extending longitudinally through the interior of said container, the lower portion of said heating element being immersed in water and the upper portion of the heating element extending above the water level, and a plurality of vertically spaced metal baffles carried by the upper portion of said heating element and adapted to be heated by the same, said baffles being cup-shaped with the outer peripheries of the same in close proximity to the inner walls of the container.

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