THERAPEUTIC APPARATUS FOR VAPOR TREATMENT OF THE EAR

Filed March 4, 1938

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THERAPEUTIC APPARATUS FOR VAPOR TREATMENT OF THE EAR

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Application March 4, 1938, Serial No. 194,006

2 Claims. (Cl. 21—125)

This invention relates to therapeutic apparatus for the vapor treatment of the ear.

It has for its general object the provision of means for generating warm medicated vapor and means for producing a pulsating flow of the vapor and for discharging it in a succession of gentle puffs or pulsations in the ear.

One of the more specific objects of the invention is to provide vaporizing apparatus of the class described including a vaporizing unit and a pump and motor unit readily separable therefrom, so as to give easy access to the interior of the vaporizing unit to facilitate cleansing the inner surfaces thereof, from time to time, of vapor condensate.

Another object of the invention is the provision of vaporizing apparatus including means forming a volatilizing chamber and a vapor heating chamber in intercommunication, with electrical heating elements in each chamber of such type as to isolate the vapors from contact with incandescent surfaces, to insure against ignition of the vapors in the event that they may be inflammable or explosive.

Another object of the invention is to provide for the conservation of the heat in the vaporizing apparatus by minimizing its radiation or escape into the associated metallic parts of the apparatus.

Still another object of the invention is the provision of a rotary impeller or pump so constructed as to draw the heated vapor from the heating chamber and to deliver it into a conduit, preferably of flexible nature having an ear nozzle, so constructed as to produce and to direct a continuous pulsating jet of warm vapor into the ear.

Another object of the invention is to provide a pump motor unit from which the pump element may be readily detached for cleansing.

Other objects of the invention will appear as a preferred and practical embodiment thereof proceeds.

In the drawings which accompany and form a part of the following specification and throughout the several figures of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a view partly in elevation and partly in section illustrating apparatus embodying the invention;

Figure 2 is a plan view;

Figure 3 is a section taken along the line 3—3 of Figure 1;

Figure 4 is a transverse section through the pump; and

Figure 5 is a section taken along the line 5—5 of Figure 1.

Referring now in detail to the several figures, the vaporizing unit comprises a plate 1 upon which are suitably secured a pair of flanged rings 2 and 3. A pair of cylindrical shells 4 and 5 are mounted upon said rings, being suitably secured as by the screws 6 shown in Figure 3. The shell 4 encloses the primary or vaporizing chamber 7 in which is mounted an electrical heating element 8 provided with a flat top or table 9 upon which a cup of the medicament in solid or liquid form may be set. The shell 4 is provided with a removable lid 10 having a knob or handle 11 and which may or may not be provided with the apertures 12 for the admission of atmospheric air.

The shell 5 encloses the secondary or vapor heating chamber 13 in which is mounted a heating element 14 which may be similar to the heating element 8. The chambers 7 and 13 are in communication by means of a pipe 15. This pipe preferably consists of two short sections coupled by a union 16 so that when necessary either of the shells 4 or 5 may be removed independently of the other.

The primary function of the electrical heating element 14 is to heat the vapor which has been volatilized by the heating element 8. Its secondary function is to volatilize a second medicinal substance where it may be desired to generate a vapor which is a mixture of the two ingredients. In such circumstances a cup of the second substance may be placed upon the top or table of the heating element 14. Preferably two stages of heat may be imparted to the heating element 8 by turning the switch 17 to low or high position, the switch controlling two circuits, not shown, in one of which a rheostat, not shown, is interposed. The electrical controls and the circuits therefor are contained within the base 19 and which, being of conventional construction, are not illustrated.

Since many of the vapors used in the medical treatment of the ear are of heavy and difficultly volatile nature, it is desirable that condensation of these vapors upon the inner walls of the chambers 7 and 13 shall be minimized. Conservation of heat is secured by the interposition of a polished plate 20 between the plate 1 and the base 19. This plate is mounted intermediate 60 between posts 21 of heat insulating material upon which rests the plate 1 with the vaporizing unit which it carries is supported.

The plate 1 is preferably provided with a peripheral groove or gutter 22 designed to catch any
of the medicament which may be spilled upon the plate 1 or run down upon said plate when spilled upon the outer surfaces of the shells 4 and 5. Due to the heat conservation produced by the polished plate 20, the plate 1 will remain hot and consequently the spilled medicament will not harden, but will collect in the gutter 22 from which it may be mopped or drained.

The top end of the shell 5 supports the pump and motor unit which as a whole is designated by the reference character 23 and which may be bodily removed from the shell 5 by loosening the screw 24, see Figure 3, or other suitable fastening means. The pump and motor unit comprises a pump casing 25 and a motor casing 26. The pump and motor casings are separated by posts 27 and 28 of heat insulating material. Said posts are sectional and support between the sections, one or more polished plates 29 and 30. Said plates have the same function as the polished plate 20, that is to say, they reflect back the radiated heat from the vaporizing unit and the pump casing, conserving it in the vaporizing and vapor heating chambers and preventing its dissipation in the motor or motor casing.

The motor is suitably secured in the casing 26 by means of bolts 31 and 32 which pass through apertures in the motor brackets 33 and 34. By means of nuts 35, threaded on said bolts, the motor brackets and with them the motor may be adjusted vertically within the motor casing 26. The motor casing is provided with the air vents 36 and a fan 37 on the armature shaft 38 maintains a circulation of air through the motor casing about the parts of the motor.

The armature shaft 38 extends into the pump casing 25 and into a socket 39 in the hub of the pump impeller 40. An end plate 41 normally closes the lower end of the pump casing and has an aperture 42 which permits the pump casing into communication with the vapor heating chamber 12.

An outlet pipe 43 communicates with the pump chamber 44 through the side of the pump casing 25, in the zone of the impeller 40. A flexible conduit 45 is connected to the pipe 43 and preferably carries at its opposite end a bifurcated fitting 46 connected by branch tubules 47 and 48 with the ear nozzles which are not shown. The impeller 40 has a peculiar construction illustrated in Figure 4. It consists of central or hub portion 49 having radial vanes 50 and 51. The vanes 50 are of such length as to approach the inner periphery of the pump casing 25. The vanes 51 alternate with the vanes 50 and are considerably shorter. The outlet pipe 43 communicates tangentially with respect to the rotation of the impeller 40. It is by reason of the difference in length between the vanes 50 and 51 that the pulsating characteristic is imparted to the out-flowing jet of heated vapor. If all of the vanes were of the length of the vanes 50 rotation of the impeller would merely sweep a path for said vanes through the vapor occupying the pump chamber, producing a continuous, but not a pulsating discharge. If all of the vanes were of the length of the short vanes 51 they would be so far away from the periphery of the casing 25 as to merely sweep a path for themselves through the vapor without creating an appreciable discharge. The function of the short vanes is to throw the body of vapor centrifugally into the annular space whose width is the distance between the wall of the casing 25 and the ends of the short vanes, while the function of the long vanes is to push this densified vapor into the outlet pipe 43.

The speed of the motor 52 is variable and controlled by the rheostat 56 and dial 18. It may be started by spinning the knurled knob 53 which forms the outer projecting end of the armature shaft 23.

Since it is inevitable that in the course of time the vapor will condense upon the impeller, making it essential to cleanse the same, access to the impeller is facilitated by the removable plate 41 by loosening the screws 42. The impeller may be removed from the armature shaft by releasing the set screw 55.

To operate the apparatus, a cup of the medicament which it is desired to vaporize is placed upon the top or table 8 of the heating element 9. The lid 10 is then replaced upon the shell 4. The apparatus having been plugged into the house current, the switch 17 is turned to low or high according to the volatile nature of the medicament. The vapor volatilized in the chamber 7 passes through the pipe 15 into the chamber 13 where it is heated. The turning of the dial 18 has closed the motor circuit so that the rotation of the impeller 40 draws heated vapor from the chamber 13 through the aperture 42 into the pump chamber 44 where the out-flowing current of heated vapor is broken into pulsations or puffs by the impeller 40. The speed of rotation of the impeller 40 and consequently the frequency and force of the pulsations is delicately controlled by the rheostat 56 and dial 18.

Upon discontinuation of the treatment, the current is turned off from the various electrical devices by the main switch, and the drawings. Condensation of the residual vapor within the apparatus necessarily occurs upon cooling which condensation must eventually be wiped out or otherwise removed. Removal of the lid 10 gives easy access to the interior of the shell 4 while entrance to the chamber 13 is gained by removing the pump and motor unit 23. The end plate 41 of the pump chamber may be removed and the impeller taken off by loosening the set screw 55.

While I have in the above description disclosed what I believe to be a preferred and practical embodiment of my invention, it will be understood to those skilled in the art that the specific details of construction and the arrangement of parts are by way of example and not to be construed as necessarily limited the scope of the invention as defined in the appended claims.

What I claim is:

1. Therapeutic apparatus for vapor treatment of the ear comprising in combination with a source of vapor, a pump adapted to produce and deliver a pulsating current of vapor to said vapor comprising a casing, an impeller in said casing, the latter being provided with a tangentially disposed outlet in the zone of said impeller, the latter having alternate long and short blades, the long blades coming in proximity to the inner peripheral wall of said casing while the shorter blades terminate at a distance remote from said peripheral wall.

2. In therapeutic apparatus for the vapor treatment of the ear having a vapor chamber, a propeller device comprising a pump housing hav- ing a socket on the wall of the vapor chamber and a removable bottom formed with a central orifice, a motor housing secured above and in spaced relation to the pump housing, heat reflecting means inter-
posed between the motor and pump housings, a shaft extending axially through said housings and reflector elements, a motor on said shaft in the motor housing and a pump secured by a hub on said shaft in the pump housing, said pump hub depending into the central orifice of said removable bottom, said pump comprising a plurality of blades, some short and some long, arranged in alternation around the hub.

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