W. H. MEYENBERG.

ELECTROMEDICAL APPARATUS.

APPLICATION FILED OCT. 29, 1920.

1,376,378. Patented Apr. 26, 1921.

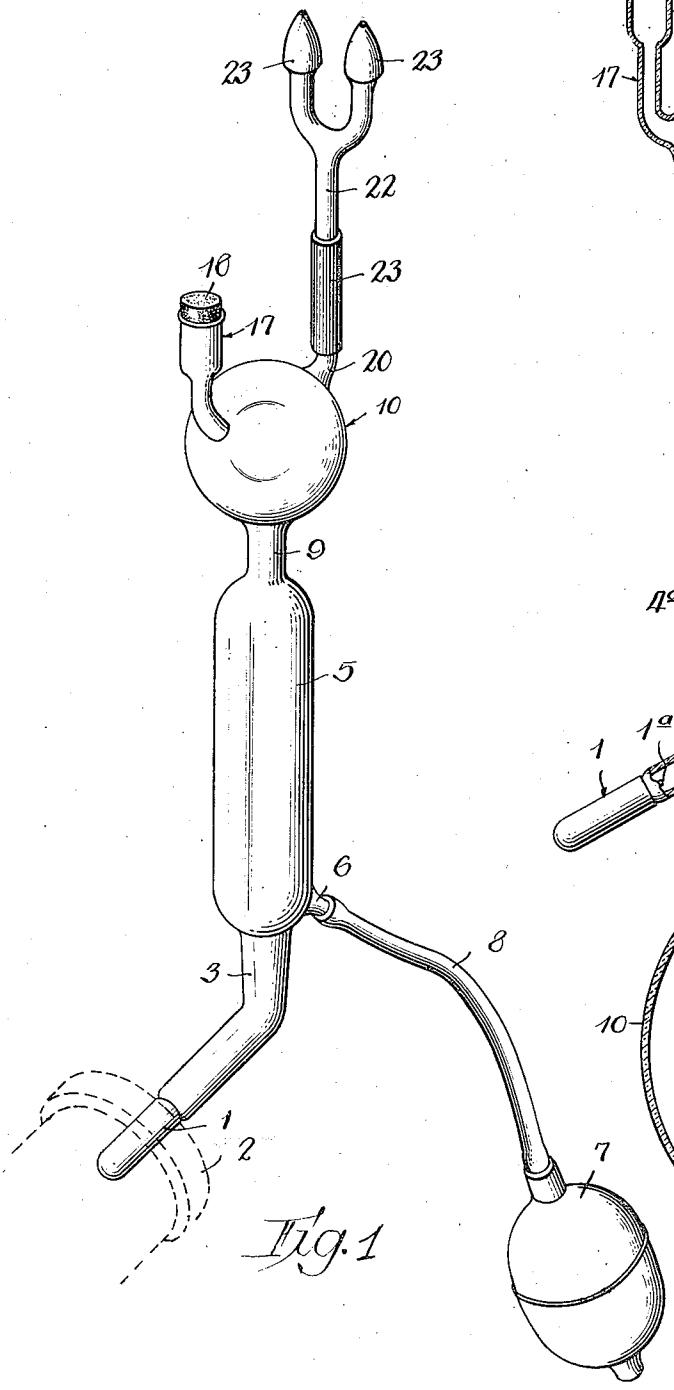


Fig. 1

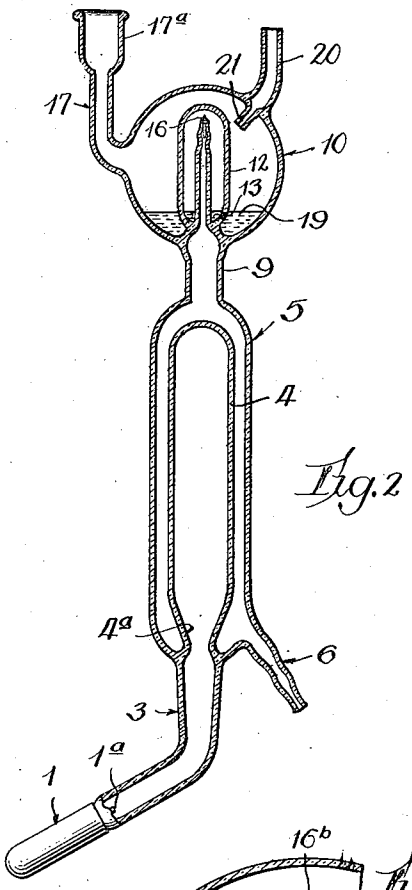


Fig. 2

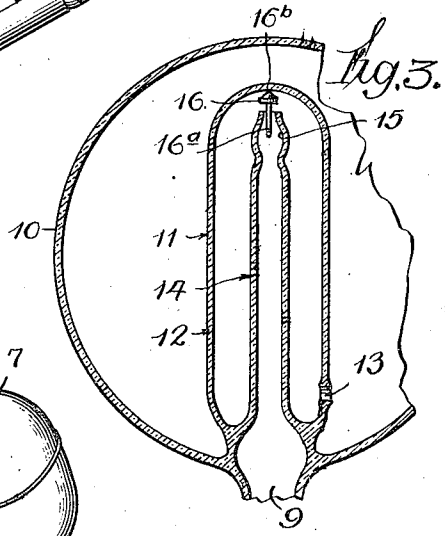


Fig. 3.

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UNITED STATES PATENT OFFICE.

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ELECTROMEDICAL APPARATUS.

1,376,378. Specification of Letters Patent. Patented Apr. 26, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM H. MEYENBERG, a citizen of Lemont, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electromedical Apparatus, of which the following is a specification.

This invention relates to improvements in electro-medical apparatus, and more particularly to apparatus of the character described having as its function the generation of ozone, an inert gas in the nature of concentrated oxygen (the symbol of which is O_3) and the forcing or pumping of ozone through a suitable discharge passage, whereby the ozone may be inhaled through the nostrils of a patient.

The generation of the ozone is obtained by the passage of an electric current of high frequency through a body or current of air, the electric current of the desired potential and frequency being generated through the medium of an induction coil and an electrode terminating within a vacuum tube or bulb. The passage of a current of air through a chamber surrounding the bulb undergoes a chemical change known as ozonation by the discharge of the current from the walls of the vacuum bulb and through the air. By the application of a device for promoting the passage of air through the surrounding air space or chamber, a quantity of ozone is thus liberated and forced from the apparatus in a manner before suggested. As a preferable construction of an apparatus herein described, there is provided intermediate the zone of ozone liberation and the discharge passage, a vessel adapted to contain a quantity of medicated liquid through which the ozonated air passes prior to its discharge from the apparatus.

It is to certain new and novel features of construction that the present invention relates, these more especially pertaining to the arrangement of the apparatus and the parts associated therewith, whereby a more complete and proper functioning is obtained. These features and the advantages procured thereby are hereinafter fully described and illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of the complete apparatus,

Fig. 2 is a view in vertical section of the apparatus, and

Fig. 3 is an enlarged detailed view in vertical section of the liquid containing vessel and valve mechanism for controlling the passage of ozone therethrough.

The apparatus as a whole may be considered as consisting of three main or essential parts; namely, the electro-chemical element comprising an electrode 1 adapted to be electrically connected with a high frequency induction coil 2, supplied electrically from a source of electric current, such as a battery. The electrode 1 is permanently connected at the lower end of an L-shaped tube 3, said electrode being provided with a terminal 1^a projecting into the interior of said tube 3. The upper end of the tube 3 communicates with a cylindric bulb 4 having a slightly contracted neck portion 4^a at its lower end, forming a similarly contracted passage connecting the tube 3 and the bulb 4, these parts being made of glass, and the interior exhausted of air, thereby providing a vacuum. A second portion of the apparatus may be termed the air supply, and consists of a cylindric glass shell 5 surrounding in concentric arrangement the vacuum bulb 4, thereby forming an outer shell or casing spaced equidistantly from said bulb 4. The shell 5 is preferably cast or blown integral with the tube 3 and bulb 4, the parts being joined immediately adjacent to the contracted neck portion 4^a of the bulb 4. Extending at an angle of substantially 45 degrees to the axis of the casing 5, and in a downward direction from the lower end thereof, is a nipple 6 adapted to have attached thereto a hand operated compression bulb 7 of rubber, through the medium of a rubber hose 8 of the same material. The upper end of the shell 5 which forms an air passage or chamber, terminates in an axially extending neck portion 9, upon the upper end of which is surmounted a spherical vessel 10 forming a container for the medicated liquid and air valve hereinbefore indicated.

The vessel 10, and parts associated therewith, may be considered the third element or portion of the apparatus, the same being of glass and cast or blown integral with the portions already referred to, said vessel being substantially spherical in shape and

communicating with the air chamber immediately below through the medium of the valve hereinbefore referred to, and constructed as follows:

Inclosed within the vessel 10 is a closed tube or cylindric bulb 12 completely shut off from communication with the interior of the vessel 10 except by the provision of a small lateral opening 13 located in the vertical wall thereof, and adjacent its lower end. Surrounded by the bulb 12, and extending upwardly therein in concentric relation thereto, is a stem or tube 14 communicating directly at its lower end with the air passage formed by the neck portion 9, and terminating at its upper end in an upwardly opening nozzle-like opening 15. Loosely mounted in the opening 15 is a valve member 16 preferably consisting of a stem 16^a surmounted by a conical shaped head 16^b, said head being so arranged that the base thereof rests upon and closes the opening 15, by gravity. Communicating with the interior of the vessel 10 is a vertical stem 17 provided at its upper end with a flaring mouth portion 17^a adapted to be normally closed by means of a stopper 18. The stem 17 is used for the purpose of filling the vessel with medicated liquid, the same being poured therethrough until the desired amount (indicated at 19 in Fig. 2) fills the bottom of the vessel to the desired level, namely, to a point slightly above the opening 13 formed in the wall of the bulb 11. Likewise communicating with the vessel 10 and projecting upwardly from one side thereof is a discharge stem 20, the same being provided with a radial extension 21 projecting into the interior of the vessel 10, and terminating adjacent the bulb 11. The discharge stem 20 is adapted to have applied thereto a tubular discharge member 22 (Fig. 1), a piece of rubber tubing 23 being employed as a coupling. As clearly shown in the drawings, the discharge member 22 is bifurcated at its upper end to form two enlarged extremities 23—23 so formed as to enter the nostrils of the patient.

The apparatus has thus far been described without reference to the formation, arrangement and proportions of the several parts whereby a more perfect and efficient action is obtained, and whereby more convenient manipulation is secured. These features will now be described more in detail.

Considering first the electro-medical element, the tube 3 has heretofore been described as L-shaped, although, as a matter of fact, the same is bent at a point intermediate its ends so that the lower end portion is inclined at an obtuse angle to the upper portion, as well as the bulb 4; that is to say, assuming that the apparatus is normally held in vertical position, the lower end portion of the tube 3 is inclined at an angle of substantially 30 degrees to the horizontal. The object of bending the tube 3 in this manner is for convenience in attaching the electrode to the induction coil 2; thus the latter may rest on a flat table or other support, the apparatus held in one hand of the patient at a slight inclination to the vertical, and in a direction toward the patient, whereas the bulb 7 would be grasped and operated by the other hand. In short, the formation of the lower end of the tube is such that the apparatus may be supported and operated in the most natural position. In this connection, it is to be observed that the nipple 6 to which the bulb 7 is attached projects from the casing or shell 5 in the opposite direction from that of the electrode 1.

Referring next to the arrangement of the parts associated with the liquid containing vessel 10, the same would ordinarily be filled to a level slightly greater than the height of the aperture 13 in order that the same may be covered. Manifestly, the liquid stands in the chamber of the bulb 11 at the same level as in the vessel, and therefore if the apparatus were tilted or held in horizontal position, the entire contents of the vessel might readily flow into the interior of the bulb, cover the open end of the stem 14, and flow downwardly into the air chamber, with the result that part of the liquid would be wasted, as well as creating a very undesirable condition within the apparatus. For this reason the bulb is proportioned diametrically so that it is capable of holding the entire liquid content of the vessel without covering the valved opening of the stem 14, and thus preventing the back flow of the liquid in the manner just described. As a further preventive of the so-called back flow, a single aperture 13 is utilized in place of a series of small openings surrounding the base of the bulb 11. Furthermore the single aperture 13 is located on the same side of the bulb 14 as is the discharge passage 20 of the vessel 10. In this manner the opening 13 would ordinarily be uncovered in all positions of the apparatus except that in which it is operated, and hence the liquid would not ordinarily enter the bulb except when the apparatus is in use. Manifestly this would not be the case where a series of openings surround the base of the bulb, or if the single opening were located at a point such that the liquid would pass therethrough when the apparatus was laid upon a table, or in any other position of disuse.

A further feature is pointed out with reference to the valve member 16. It is to be observed that the upper end of the stem 15 terminates in close proximity to the end of the bulb 11, the latter serving to limit the upward movement of the valve. In actual

use the inner surface of the bulb becomes coated with the medicinal liquid, and a more or less sticky surface results. Were the valve member provided with a head having a flattened top surface, there would be a tendency for the same to adhere to the surface of the bulb, with the result that the valve would remain open or "stick," thus interrupting the action of the apparatus. In order to overcome this possibility, the head 16^b of the valve member 16 is formed in conical shape so that when the same engages the wall of the bulb 11, there is but a single point of the valve member in contact with the surface of the bulb, and hence the sticking tendency is obviated.

Although the purpose and mode of operation of the apparatus has been alluded to in connection with the description of its construction, a clearer understanding will be secured from the following:

The apparatus is first attached to the induction coil 2 by inserting the electrode 1 into a socket provided for the purpose. By exciting the induction coil through the medium of a battery, or the like, the high frequency current is discharged from the electrode terminal 1^a into the bulb 4 through the tube 3, this current being distributed throughout the bulb in the form of visible rays of violet color. These rays are discharged from the surface of the bulb 4, pass through the air space surrounding the same to the outer shell or casing 5, the contact of the electric current with the air accomplishing the chemical effect known as ozonation, or generation of ozone. The apparatus is held by the patient as before suggested; namely, by grasping the casing 5 with one hand, and operating the rubber bulb 7 with the other, the latter being alternately squeezed and released in the usual manner, whereby the air is forced or pumped upwardly through the air chamber. The air thus forced through the air chamber is discharged through the valve opening 15 into the interior of the bulb 11, and from thence through the aperture 13 below the level of the liquid 19 in the vessel 10. In passing upwardly through the liquid, the ozonated air is partially saturated with the liquid, and is immediately discharged through the passage 20 and the nasal extremities 23 into the nostrils of the patient, the ozone content of the air coupled with the medicinal properties of the liquid being calculated to relieve diseased conditions existing in the nostrils or pulmonary organs of the patient.

Although I have described and illustrated a preferred form of the apparatus, the novel features associated therewith may obviously be further modified without departing from the spirit of the invention. Therefore I do not wish to be limited except insofar as the invention is more specifically set forth in the appended claims.

I claim as my invention:

1. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding said tube and forming an air space, a vessel communicating with said air space and adapted to contain a quantity of liquid, and a valve intermediate said vessel and air space for preventing the flow of liquid into said space from said vessel.

2. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding said tube and forming an air space, a vessel communicating with said air space and adapted to contain a quantity of liquid, means for discharging the air from said air space through said liquid, including a valve for preventing the liquid from flowing from said vessel into said air space.

3. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding the same and forming an air passage, means for creating an electrical discharge between the vacuum tube and the shell, means for forcing air through said air passage, a vessel formed integral with said shell, a stem extending into said vessel and communicating with said air passage, a bulb surrounding said stem and having an aperture communicating with the lower part of said vessel, and a valve member mounted in the discharge opening of said stem.

4. In an electro-medical apparatus, the combination of a vacuum chamber, a shell surrounding the same, means for creating an electrical discharge between the vacuum chamber and the shell, and means for pumping air through the space between the vacuum chamber and the shell, means for passing said air through a liquid on its passage from the space between the chamber and the shell, and a valve for preventing the liquid from flowing into said space.

5. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding the same and forming an air passage, electrical elements for creating an electrical discharge between the vacuum tube and the shell, means for forcing air through said air passage, a stem communicating with said air passage and provided with a valve member at its discharge end, a bulb inclosing said stem and having a single aperture at its base, and a vessel surrounding said bulb and adapted to contain a sufficient quantity of liquid to cover said aperture.

6. In an apparatus of the character described, the combination of an electrochemical element comprising a vacuum tube, an electrode and a source of high frequency electric current, a shell surrounding said tube and forming an air passage, means for forcing air through said passage, a liquid containing vessel having a discharge pas-

sage communicating therewith, and a chamber intermediate said air passage and vessel comprising a bulb located within said vessel, having an aperture adjacent its base, and a stem extending upwardly into said bulb above the normal level of the liquid in said vessel, and a valve member mounted in said stem.

7. In an apparatus of the character described, the combination of an electro-chemical element comprising a vacuum tube having an electrode at one end thereof, an integral shell surrounding a portion of said tube and forming an air chamber having an inlet and outlet passage, means for pumping air through said chamber, a vessel communicating with the discharge end of said air chamber, and provided with a discharge passage, and a bulb mounted in said vessel and communicating with said vessel through a relatively small aperture adjacent the base of said bulb, and a stem forming a continuation of said air chamber discharge passage, extending into said bulb and above the aperture thereof, and a valve member in said stem.

8. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding the same and forming an air passage, means for creating an electrical discharge from the vacuum tube, means for forcing air through said air passage, a vessel mounted on said shell and adapted to contain a quantity of liquid, a stem extending into said vessel and communicating with said air passage, a bulb within said vessel and surrounding said stem and communicating with the lower part of said vessel, said bulb being capable of holding a considerable portion of the liquid contents of said vessel.

9. In an electro-medical apparatus, the combination of a vacuum tube, a shell surrounding the same and forming an air passage, means for forcing air through said air passage, a stem communicating with said air passage, a bulb inclosing the end of said tube, and a valve member mounted in the end of said stem and adapted in one position to contact with the surface of said bulb, said valve member being shaped to present a single point of contact with the surface of said bulb.

10. In an electro-medical apparatus, the combination of a vacuum chamber, a shell surrounding the same, means for causing an electrical discharge between the vacuum chamber and the shell, means for forcing air through the space between the vacuum chamber and the shell, means for passing said air through a liquid in its passage from the space between the chamber and the shell, and means for preventing the back flow of the liquid into said space.

11. In an apparatus of the character described, the combination of an electro-chemical element comprising a vacuum tube adapted to be held in substantially vertical position, an electrode at the lower end of said tube, a source of high frequency electric current adapted to be attached to said electrode, the lower portion of said tube being inclined at such an angle to the upper portion thereof as to permit the support of the source of electric current upon a horizontal surface, and the apparatus to be held in substantially vertical position.

12. In an apparatus of the character described, the combination of an electro-chemical element comprising a vacuum tube having an electrode at the lower end thereof, a shell surrounding the upper portion of said tube and adapted to be held in one hand of the user, means operative by the other hand of the user for pumping air through said chamber, an induction coil adapted to be connected with the electrode, the end portion of the tube including said electrode being inclined at an obtue angle to the remaining portion of said tube.

In witness whereof, I hereunto subscribe my name this 23 day of October, A. D. 1920.

WILLIAM H. MEYENBERG.