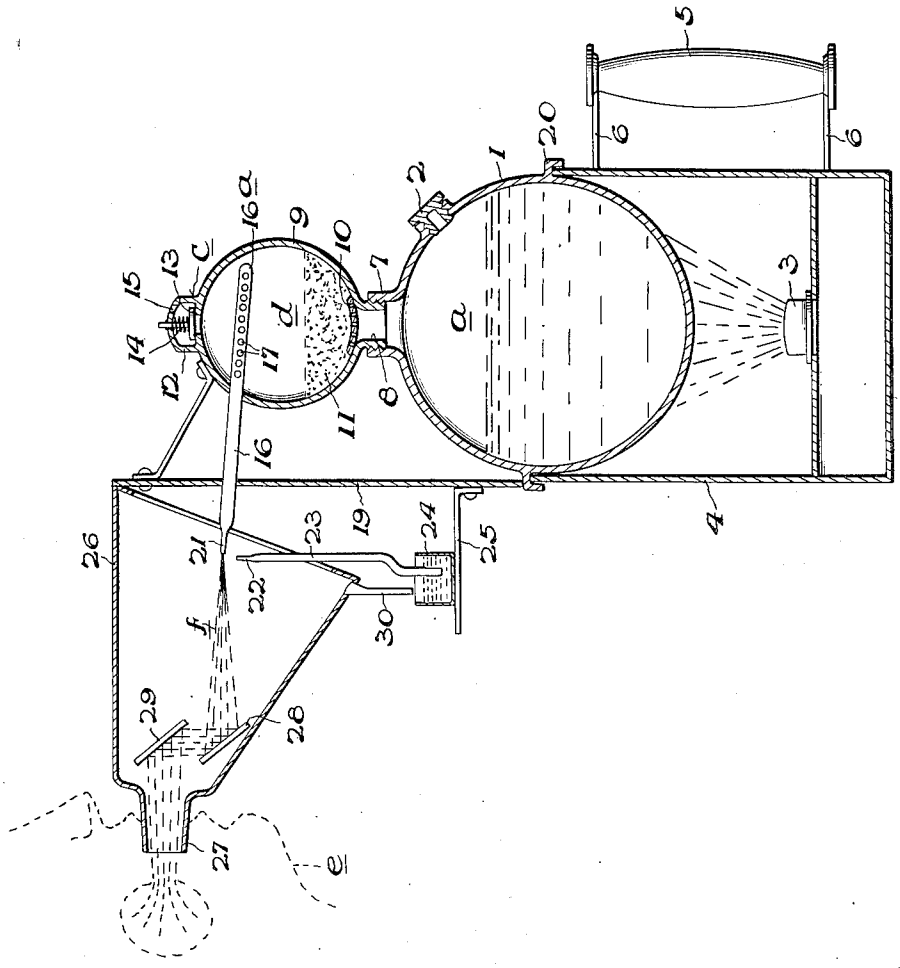
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ATOMIZING APPARATUS

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INVENTOR

Horacio Peirano.

BY

ATTORNEY

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ATOMIZING APPARATUS

Horacio Peirano, Montevideo, Uruguay

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1 Claim. (Cl. 128—173.2)

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The present invention relates to an atomizing apparatus, i. e., an apparatus designed to apply healing solutions in suspension to the respiratory channels of the human body after the said solutions have been reduced to fine particles by an atomizing process.

For a better understanding of the apparatus to which the principle of the present invention has reference, it is well to remember that atomization as a medium for therapeutic treatments was used as early as the end of the last century, but only in recent times has medical science adopted this method for a great variety of curative processes. By "atomization" is meant the process of suspending a medicament in the atmospheric air so as to convey the medicament to the respiratory channels by direct aspiration.

To insure the efficiency of applications by means of the atomizing apparatus, the latter must convert the solutions into extremely fine particles not exceeding the size of two microns so that the medicament may thoroughly penetrate the intended parts and carry its curative action to the bronchial tubes and lungs, for example. To accomplish this, it is clear that the system here involved must be very different from ordinary sprays where special apparatus are required in order to obtain the desired effect. In fact, the apparatus of the present invention is adapted to convey the atomized medicament by means of a stream of dry vapor projecting through a nozzle or Venturi tube.

To reduce the particles carried along by the stream to micrometric dimensions, the stream is subjected to repeated impacts on surfaces which project it, with the result that a mist, called "aerosol," is produced which, by means of a tube, is introduced into the mouth, or any other cavity, of the patient, thus permitting the simultaneous introduction of the medicament.

One embodiment of the apparatus here involved is hereinafter described by way of example, reference being made to the accompanying drawing which shows the apparatus in section and in the functional position.

The figure is a vertical cross sectional view of the apparatus.

Similar reference characters designate like parts throughout the figure of the drawing.

A hollow spherical container 1, preferably of bronze, forming a chamber *a*, holds the water to be heated for transformation into vapor. The water is introduced through an opening adapted to be hermetically sealed by means of a removable stopper 2. The container 1 is maintained within the radius of action of a heat source 3, which may be an alcohol lamp or any other suitable means, provided in a supporting casing 4, the open end of which supports the container. The said casing is provided with a handle 5 secured to two lugs 6 extending radially from casing 4.

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The container 1 has a threaded outlet in the form of a neck 7 which receives the mating threaded neck 8 of spherical member 9 of smaller dimensions than the container 1. The upper spherical member is provided with a laminar filter 10 mounted at the end of the passage defined by neck 8. Filter 10 supports bronze shavings 11 which act as a means of retaining drops of water that might be carried along by the vapor in its ascent toward spherical member 9. The purpose of filter 10 is to prevent shavings 11 from falling by gravity into chamber *a* where the vapor is generated, without obstructing the passage of the vapor and the return of drops of water retained by the shavings.

Upper spherical body 9, providing chamber *d*, serves to trap any condensed vapor coming from steam supplied by chamber *a*. In the dome of the upper chamber is a hollow extension 12 forming a chamber *c* for discharging the excess vapor accumulating in chamber *d* to the exterior, communication between chambers *d* and *c* being regulated by a valve arrangement 13 which acts as an automatic equilibrator of the pressure within the chamber *d*, thus avoiding the danger of excess pressure in chamber *d*, whence the excess vapor, after overcoming the resistance of the spring controlling the valve arrangement between chamber *d* and *c*, to be released to the atmosphere through discharge opening 16 provided in the hollow extension 12.

Rigidly secured to spherical body 9 is a tubular member 16 which extends into the interior of chamber *d* defined by spherical body 9. Section 16*a* of tubular member 16 is provided with multiple openings 17. The opposite end of tubular member 16, which is secured to a supporting wall 19 extending from one of the edges of flange 20 by means of which hollow spherical body 1 is secured to casing 4, terminates in a nozzle 21 forming an outlet passage for the vapor in the atomized state. Perpendicular to this nozzle there is provided nozzle 22 of a tubular member 23 extending from the interior of a receptacle 24 which contains the medicinal or curative substance. This receptacle is supported by a bracket 25 rigidly secured to wall 19. A bell or hood 26.

in the form of a truncated cone, is secured to the rear wall 19. The forward end or outlet of said bell consists in a nozzle 27 adapted to be introduced into the mouth of the patient as shown in the accompanying drawing where a fragment of head *e* is illustrated.

Within bell 26 and adjacent to the rear end of nozzle 27 are two baffle surfaces 28 and 29, mounted parallel to each other and in oblique direction relative to the horizontal axis of the said nozzle. A tubular member 30 for the return of condensed water particles to receptacle 24 completes the apparatus.

The operation of the apparatus proceeds as follows:

After the water in chamber *a* reaches the boiling point, the vapor generated in that chamber rises into chamber *d* across filter 10 and shavings 11. The vapor passes by its natural pressure through openings 17 into section 16*a* of tubular member 16 in which the vapor continues its movement toward discharge nozzle 27. Suction in tube 23 caused by vapor pressure issuing from nozzle 21, causes the content of receptacle 24 to rise through 23 and to become mixed, in the atomized state, with the vapor with which it comes into contact after leaving atomizing nozzle 22. This effect is obtained as a result of the high speed with which the vapor leaves nozzle 21 of tubular member 16. Thus atomized, the mixture forms a jet *f* which collides with the lower projecting surface 28, whence it is projected against the upper surface 29, which, in turn, projects the mixture toward the mouth of the patient through nozzle 27.

Both baffle surfaces 28 and 29 are constituted by flat glass plates in such a way as to cause, through the effect of the impact, the breaking up of the particles until they are reduced to dimensions smaller than two microns, whereby transformation of the mixture into the atomized state is completed.

The structural and functional factors of the apparatus forming the object of the present invention and its application for curative purposes through atomization being now clearly apparent from the preceding description and illustration by the drawing, further explanations are deemed unnecessary.

I claim:

In a medicinal atomizer having a steam discharge nozzle in aspirating relation to medicament nozzle, the combination comprising, a substantially conical bell having its axis disposed obliquely to the axis of the steam discharge nozzle, said bell having a relatively large inlet end receiving and masking the said steam discharge nozzle and medicament nozzle and also having a reduced discharge end forming a treatment nozzle whose axis is substantially parallel with and above the axis of said steam discharge nozzle, and a pair of upper and lower vertically spaced baffle plates having facing impact surfaces disposed in parallel relation, said plates supported in the bell in oblique relation to the axis of the steam discharge nozzle, the lower plate having its impact surface in the line of the medicated steam jet projected in the direction of the axis of said steam discharge nozzle and directing said jet toward the impact surface of the supper baffle which in turn directs the medicated jet through said treatment nozzle.

HORACIO PEIRANO.

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