SPECIFICATION

Apparatus for heating of the nasal passages

The present invention relates to apparatus for local heating of a portion of the human body and to medical equipment generally.

It has been shown by Andre Lwoff that a small increase in temperature above the optimum can stop viral development and eventuallylead to the destruction of a virus. This theory is here applied to the common cold. Inhalation of hot humidified air, for example between 37 and 42 degrees Celcius inhibits or aborts the diseases caused by zhinoviruses. A general review on temperature and viruses has been published in an article entitled "La Virulencia de Los Virus Y La Lucha del Organismo Contra La Infeccion Viral" (Spanish), Fundacion F. Cuenca Villoro Instituto de Investigacion Ulta Zaragoza, Spain, 1974.

The present apparatus is designed to provide controlled heating of the nasal mucosa of a patient. While other local heating apparatus is known in the prior art, the present apparatus differs therefrom in that it provides a stream of hot wet air under pressure and at a precisely controllable temperature.

There is thus provided in accordance with an embodiment of the present invention apparatus for heating nasal mucosa comprising: apparatus for heating a stream of a gas; apparatus for humidifying the stream of gas; and apparatus for directing a stream of humidified and heated gas provided by said heating and humidifying apparatus to the nasal mucosa of the subject.

Further in accordance with an embodiment of the invention, the heating means comprises a controllable heating element, temperature sensing apparatus and apparatus for governing the operation of the heating element in response to the sensed temperature of the system of gas.

Additionally in accordance with an embodiment of the invention the humidifying means comprises means for sonicating a liquid and means for supplying said sonicated liquid to said stream of gas.

The invention will be more fully understood and appreciated from the following detailed description taken in conjunction with the drawing in which:

Figure 1 is a schematic sectional illustration of heating apparatus constructed and operative in accordance with an embodiment of the invention; and

Figure 2 is a schematic block diagram illustration of temperature control circuitry useful in the heating apparatus of Figure 1.

Referring now to Figure 1, there is seen apparatus for heating nasal mucosa comprising a housing 10, typically formed of P.V.C. pipe and first and second end members 12 and 14 also formed of a plastics material. A gas inlet port 16 communicates through an appropriately sized aperture in end member 12 with an inlet chamber 18, interior of housing 10. Gas inlet port 16 may be conveniently connected to a source of pressurized air (not shown) or any other suitable gas (not shown). According to a preferred embodiment of the invention, filtered air is provided at a pressure of 2.0 - 2.25 Kg/cm^2.

Chamber 18 is defined by a side wall 20 and an end wall 22. End wall 22 is apertured to define a passageway 24 from chamber 18 to a channel 26 in which is disposed an electrical heating element 28. Heating element 28 is coupled to a source of electrical current via conductors 30 and 32 which extend inside chamber 18 through pressure seals 34 in wall 20 for connection, in series to a contact thermostat 36, whose location will be described hereinafter, and to a power cable 38, which is connected to an electrical power source, via suitable control circuitry (not shown).

Channel 26 terminates in an apertured end wall 37 defining a narrow fluid passage 39 typically of 1 mm diameter for the passage of a narrrow stream of pressurized gas therethrough. A spring 35 is disposed between heating element 28 and end wall 37 to hold the heating element securely in position despite vibration which occur naturally during operation thereof. Just beyond and below passage 39 is located the open end of a liquid supply tube 40 which communicated with the interior of a liquid container 42 in which water or any other suitable liquid may be provided. Container 42 is supported by a threaded mounting member 44 attached to cylinder 26. Mounting member 44 is apertured to define a communication passageway 45 between the interior of container 42 and a chamber 48, which is defined by channels 26 and a channel 60.

The stream of hot air passing over the opening of liquid supply tube 40 causes liquid to be drawn out of the tube and to be effectively broken into small droplets, i.e. atomised, and sprayed in the air.

The hot wet air produced in chamber 48 impinges upon a temperature sensor 62, such as a thermistor or thermocouple, connected by electrical cable means 64 to suitable control circuitry (not shown). This control circuitry, which will be described in connection with Figure 2 determined the temperature of the heating element 28 in accordance with the temperature sensed at sensor 62. The temperature regulated wet air emerges from chamber via exhaust noxxles 70 which are positioned adjacent a subject's nostrils. Nozzles 70 extend through end wall 14 via a suitably sized aperture formed therein, and are sealed with respect thereto by sealing rings 72.

Disposed below the outlet of nozzled 70 is a drip collector 74 having a drain cock 76.

Reference is now made to Figure 2 which shows in schematic illustraion, temperature control circuitry for use with the apparatus above described. A comparator 80 receives inputs from a manually settable temperature set indicator 82 which may conveniently be in the form of a dial. Comparator 80 also receives an input from temperature sensor 62 (Figure 1) which measures the actual temperature of the hot wet air being dispensed. In response to the difference between the two indicated temperatures, comparator 80 provides an electrical signal to relay means 84 which in turn operates the heating element 28 (Figure 1) at such temperature and at such time intervals as is necessary to maintain a desired air temperature within a desired range of ± 0.15°C.

It will be apparent to persons skilled in the art that

the above description of a preferred embodiment is merely exemplary and does not seek to limit the invention. The scope of the invention is determined only by the claims which follow:

CLAIMS

1. Apparatus for heating nasal mucosa comprising:
means for humidifying said stream of gas; and
means for directing a stream of humidified and heated gas provided by said heating and humidifying means to the nasal mucosa of a subject.

2. Apparatus according to claim 1 wherein said heating means comprises:
a controllable heating element;
temperature sensing means; and
means for governing the operating of the heating element in response to the sensed temperature of the stream of gas.

3. Apparatus according to either of claims 1 and 2 wherein said heating means provides heated air at a temperature of from 37 and 42 degrees C approximately.

4. Apparatus according to any of the preceding claims wherein the humidifying means comprises means for sonicating a liquid in contact with said stream of gas.

5. A method of providing a stream of humidified gas for treating a patient which comprises heating a stream of the gas;
humidifying said stream of gas; and
directing said stream of humidified and heated gas for application to the nasal mucosa.

6. Apparatus for heating nasal mucosa substantially as hereinbefore described and illustrated by reference to the accompanying drawings.

7. Apparatus substantially as shown in any of the drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1982.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

the above description of a preferred embodiment is merely exemplary and does not seek to limit the invention. The scope of the invention is determined only by the claims which follow:

CLAIMS

1. Apparatus for heating nasal mucosa comprising:
means for humidifying said stream of gas; and
means for directing a stream of humidified and heated gas provided by said heating and humidifying means to the nasal mucosa of a subject.

2. Apparatus according to claim 1 wherein said heating means comprises:
a controllable heating element;
temperature sensing means; and
means for governing the operating of the heating element in response to the sensed temperature of the stream of gas.

3. Apparatus according to either of claims 1 and 2 wherein said heating means provides heated air at a temperature of from 37 and 42 degrees C approximately.

4. Apparatus according to any of the preceding claims wherein the humidifying means comprises means for sonicating a liquid in contact with said stream of gas.

5. A method of providing a stream of humidified gas for treating a patient which comprises heating a stream of the gas;
humidifying said stream of gas; and
directing said stream of humidified and heated gas for application to the nasal mucosa.

6. Apparatus for heating nasal mucosa substantially as hereinbefore described and illustrated by reference to the accompanying drawings.

7. Apparatus substantially as shown in any of the drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1982.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.