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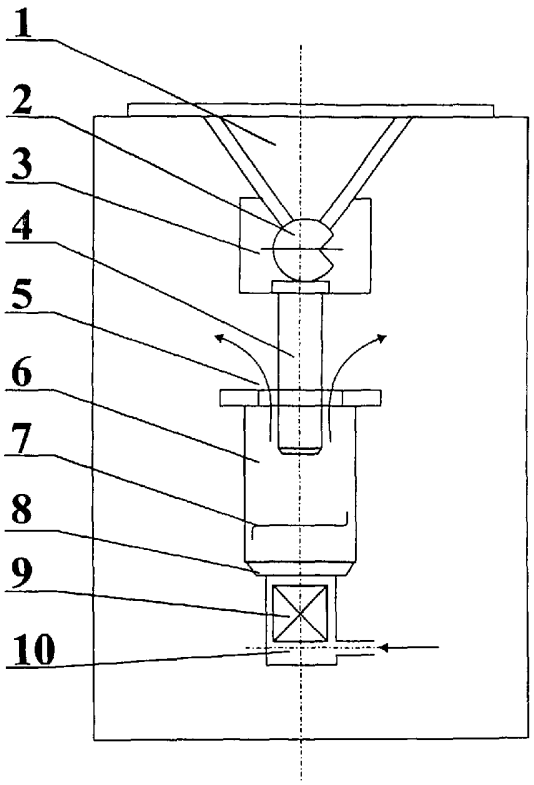
(54) Title: METHOD FOR PREPARATION OF SALT AEROSOL WITH PREDEFINED CONCENTRATION



(57) Abstract: The present invention, the method for preparation of salt aerosol with predefined s concentration belongs to the field of medical techniques. It can be used for treating respiratory tract problems and for preventive purposes, both in salt chambers of in-patient and out-patient clinics. The aim of the present invention is to develop method for preparation of salt aerosol with predefined concentration and size of salt particles activated with kinetic energy, by which dry coarse salt is directed by help of determined dosage process onto intensively operating salt-grinding instrument. The crystal structure of coarse salt breaks due to impacts with grinding instrument; the salt particles activate with kinetic energy and the aerosol with required quality is prepared in the grinding chamber by mixing of salt particles with compressed air with controlled flow. By help of such method a homogeneous salt aerosol can be prepared with predetermined concentration and salt particles activated with kinetic energy. The produced salt aerosol is directed smoothly by help of additional compressed air into the salt chamber, where the salt therapy (halotherapy) process with improved quality is carried out.

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METHOD FOR PREPARATON OF SALT AEROSOL WITH PREDEFINED CONCENTRATION

FIELD OF THE INVENTION

The present invention, the method for preparation of salt aerosol with predefined concentration belongs to the field of medical techniques and can be used for treating respiratory tract problems and for preventive purposes, both in salt chambers of in-patient and out-patient clinics.

BACKROUND TO THE INVENTION

A known method for preparation of salt aerosol is described in the patent SU 1793932, where the aerosol is obtained by using a salt crusher. The salt crusher works periodically by switching on and off, depending on the signals received from the aerosol concentration sensors.

Other method is given in the patent RU 2190482. The object of the invention is the method of obtaining a spray, which is based on affecting the material being crushed by ultrasound vibrations. The source of vibrations, comprising a piezo element, has been produced in such a way that by changing the parameters of vibrations it is possible to change the size of aerosol particles.

The patent RU 2025139 discloses a device for preparation of salt aerosol. The upper part of the case of the device has a spiral-shaped horizontal air channel; the air that gets into the device, by moving spirally, creates rarefied air.
The grinded salt particles are expelled from the mill due to centrifugal forces and partially due to rarefaction for example into the chamber with an artificial microclimate.

The author's certificate SU 1741809 discloses the invention which is directed to a device for preparation of common salt aerosol for treatment of patients, who have bronchial asthma. The dispersity of the aerosol is controlled by help of pneumatic throttle, which is connected to grinding chamber and enables control of air flow.

The patent application PCT/US96/03528 (WO 96/31221) and the patent US 5747002 are directed to a method for preparation of sodium chloride formulations having a substantially uniform particle size suitable to ensure the dispersible properties for inhalation into the lungs of a subject. The method involves jet milling coarse sodium chloride in one or preferably two or more procedures using air pressure suitable to produce particles having a significant fraction that are less than about 7 microns in size. Immediately following the milling, the particles are vacuum dried to prevent substantial aggregation over time.

The invention disclosed in the patent RU 2062120 is directed to a device for individual threatment of respiratory diseases, which comprises case with grinded salt rock, air duct, diffuser, and is equipped with connection element for the patient. Such construction enables inhalation of curative salt aerosol as a result of normal breathing process.

The invention disclosed in the patent RU 2058768 is directed to a salt chamber which walls are made from salt blocks and which comprises a saturation filter, pressure fan and, in opposite wall, a diffuser and sucking fan. Such system prepares the salt aerosol.

Drawback of all known methods for preparation of salt aerosol is that the prepared aerosol contains amount of "macroscopic" salt particles; there is not sufficient quantity of salt particles activated with kinetic energy, because the grinding of coarse salt crystal structure does not take place directly during continuous process of aerosol preparation.

NATURE OF THE INVENTION

The aim of the present invention is to develop method for preparation of salt aerosol with predefined concentration and size of salt particles activated with kinetic energy, by which

dry coarse salt is directed by help of determined dosage process onto intensively operating salt-grinding instrument.

The crystal structure of coarse salt is broken due to impacts with grinding instrument, the salt particles are activated with kinetic energy and an aerosol with required quality and primary concentration is prepared in the grinding chamber by mixing of salt particles with primary compressed air with controlled flow. Compressed air is directed into grinding chamber and mixed with grinded salt particles directly during process of breaking the crystal structure of coarse salt. The produced salt aerosol is directed into the salt chamber by help of controlled secondary airflow.

The salt aerosol received using the present method is of maximum homogeneous quality; the salt particles are activated with kinetic energy; the sizes of particles are 2 to 5 microns with a fraction of such particles of at least 90% in the aerosol; the concentration of the salt aerosol is 0.5 - 60.00 mg/m^3.

FIG. 1 depicts a salt aerosol generator with doser which uses the method being described.

In order to obtain the aerosol, the coarse grained salt is poured into the salt depository 1, from which, by means of the dosing rotor 2, the coarse salt is directed from the doser 3 through the channel 4 into the mill 6, where the crystal structure of the coarse salt is broken by help of salt-grinding instrument 7. The grinding instrument 7 of the mill 6 is operating with continuous intensivity, which provides homogeneously crushed salt crystal powder. The required aerosol appears by mixing salt particles and compressed air in the grinding device. The compressed air is directed into the mill 6 through the air channels 8 and 10. The compressed air forces the aerosol from the mill 6 through the upper part 5 of the mill into the salt chamber.

The method being described enables the salt chamber to provide a salt treatment (halotherapy) process of new higher quality, which is created by the salt aerosol activated with kinetic energy.

PATENT CLAIMS

1. A method for preparation of salt aerosol with predefined concentration **wherein** the doses of coarse salt are determined and fed from the doser (3) directly onto salt-gringing instrument (7) operating intensively and continuously grinding salt crystals, the salt particles are activated by kinetic energy and mixed by compressed air.

2. The method according to claim 1 **wherein** the coarse salt is grinded and mixed by compressed air in a continuous process.

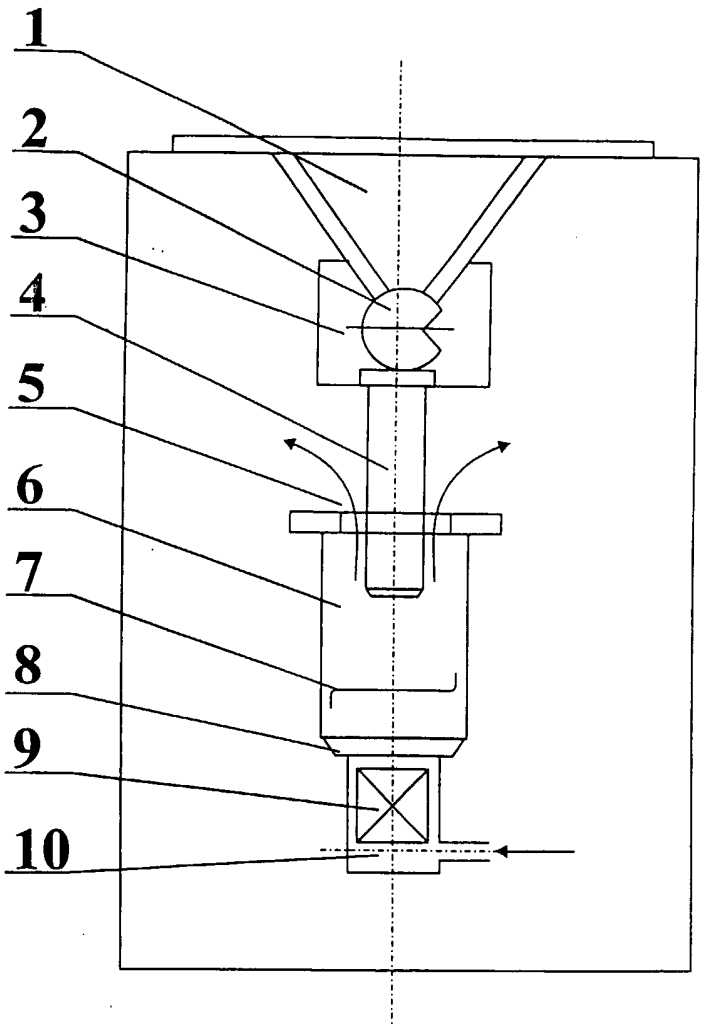

Fig.1

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K9/12 A61K33/14 A61P11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	figure 1 -& DATABASE WPI Section Ch, Week 199531 Derwent Publications Ltd., London, GB; Class B07, AN 1995-238729 XP002323521 & RU 2 025 139 C1 (RODIN L V) 30 December 1994 (1994-12-30) abstract	1,2

X	US 5 747 002 A (CLARK ET AL) 5 May 1998 (1998-05-05) cited in the application	1,2
Y	figure 1	1,2

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Winger, R

INTERNATIONAL SEARCH REPORT

Inte ial Application No
PCT/EE2004/000008

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

Inter Application No
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