



- (51) International Patent Classification:
A61M 11/00 (2006.01)
- (21) International Application Number:
PCT/TR2016/050226
- (22) International Filing Date:
14 July 2016 (14.07.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2015/08843 15 July 2015 (15.07.2015) TR
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- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(54) Title: NEBULIZER WITH DIFFERENT BLOWING SPEED

(57) Abstract: The invention is related to controlling and directing blowing speed of the nebulizer which turns the liquid medicine into vapor in the form of inhalable particulates, especially in devices using mesh technology, for enabling the medicines with different densities to be taken in duration and amounts determined by the expert physician according to the patient's needs.



WO 2017/010961 A1

NEBULIZER WITH DIFFERENT BLOWING SPEEDS

Technical Field

The invention is related to ensuring the nebulizer device which turns therapeutic dose of liquid medicine into an aerosol vapor in the form of respirable particles for being inhaled in a short time and reaching to the lungs, to have different blowing speeds.

More specifically, the invention is related to ensuring the medicines with different densities to be given by the treatment method and speed prescribed by the doctor depending on the needs of patients, with the device which turns liquid medicine into vapor in the form of respirable particles and which especially use mesh technology.

State of the Art

Use of medicine by nebulization is preferred at increasing rates in recent years due to its significant advantages such as local and fast effect, lower dose and less side effects as against systemic use of medicines.

Such devices allow the medicine to be given effectively to the small children, to the patients with severe asthma and to the patients to whom medicine cannot be given at a specified dose.

The nebulizer turns the liquid medicine into vapor with basically sound waves, a straining and loosening plate and compressed air and allows to be taken through inhalation.

The vibrating mesh nebulizer includes a vibratory plate that strains and loosens when electric is supplied. Such plate has approximately 1000 holes on it and aerosol medicine particles are formed by micro-injection through such holes.

Nebulizers with mesh technology turn the liquid medicine called nebul into gas form by vibrating a piezoelectric part at a certain frequency. The medicine which turned into gas form is taken by the patient through inhalation.

The dosage, density and duration of intake of such medicines varies according to course of the disease.

Densities of the Nebul medicines in the market and prescribed by doctors also vary.

With the devices using current art, blowing speed can not be changed, so depending on the density differences, some medicines affect fast and some affect slower than desired.

Such medicines are used for vital shortness of breath and respiratory system, so taking speed, amount and effecting period are of great importance.

With the devices using current art, fluid medicines with low density may be blown faster than normal and medicines with high density may be blown slower.

This case makes treatment process difficult for the physician in terms of time and amount depending on the density of current medicine and patients need to control the medicine amount required for treatment according to density of the medicine.

Medicines currently used are not blown in the same speed and this case can affect true completion of treatment process. In addition, the time required for relief of patients may be shorter or longer and patients who need to take the medicine in a lower dose and long time may unintentionally take more medicine in a short time.

Moreover, inability to control the blowing speed prevents doctors to identify patients' treatment personally.

A patient with a high degree of dyspnea may need to take the medicine faster in order to relieve as soon as possible or a patient with a low dyspnea may need to take slower.

Deficiency of the existing systems is that the devices using current art operate with constant speed and it can not be set depending on the density and condition of the medicine.

In addition, the dose can not be set and this may cause consumption of more medicine, waste of medicine and may lead to additional health problems.

Considering the type of diseases, medicine diversity and the medicines to be taken fast or slowly according to course of the disease, the use of such devices for therapeutic purposes has necessitated an improvement in the blowing speed.

In addition, controlling the speed will allow proper detection of the dose and taking time.

A study on implementations of the current art and the applications made on the issue has showed that no study was made for controlling the blower speed.

Considering intended use of the nebulizers, it is important to ensure the medicine to reach the lungs, in a dose and period determined by the expert physician depending on course and condition of the disease.

At this point, the invented mechanism has easy to use features that respond to the needs mentioned above and allows blowing at different and desired speeds with the speed setting button on body of the nebulizer.

Object and Brief Description of the invention

The invention is related to controlling and directing blowing speed of the nebulizer which turns the liquid medicine into vapor in the form of inhalable particulates, especially in devices using mesh technology, for enabling the medicines with different densities to be taken in duration and amounts determined by the expert physician according to the patient's needs.

Object of the invention is to control blowing speed of the nebulizer, especially in devices using mesh technology, which allows controlling the duration of medicines with different densities that may vary from person to person depending on the course of disease.

Another object of the invention is to enable the current medicines with different densities to be blown at desired speed.

Another object of the invention is to enable physician to prepare a more flexible and special treatment process for the patients.

Another object of the invention is to prevent unnecessary consumption of medicines by providing use of medicines in the time and amount appropriate for the treatment.

Another object of the invention is to enable the dose required by the patient to reach the lungs at the optimum time and amount.

With the invention, speed of the nebulizer is controlled and current medicines can be blown at the same speed notwithstanding the density and physicians are enabled to choose treatments specific to needs of their patients.

DETAILED DESCRIPTION OF THE INVENTION

Nebulizers with mesh technology turn the liquid medicine called nebul into gas form by vibrating a piezoelectric part at a certain frequency. The medicine which turned into gas form is taken by the patient through inhalation.

The dosage, density and duration of intake of such medicines varies according to course of the disease.

Densities of the Nebul medicines in the market and prescribed by doctors also vary

With the devices using current art, blowing speed can not be changed, so depending on the density differences, some medicines affect fast and some affect slower than desired.

With the invention, speed of the nebulizer is controlled and current medicines can be blown at the same speed notwithstanding the density and physicians are enabled to choose treatments specific to needs of their patients, also unnecessary consumption of medicines is prevented by providing use of medicines in the time and amount appropriate for the treatment.

The vibrating mesh nebulizer includes a vibratory plate that strains and loosens when electric is supplied.

Such plate has approximately 1000 holes on it and aerosol medicine particles are formed by micro-injection through such holes

Mesh and Ultrasonic Nebulizers operates by vibrating a piezoelectric plate at a certain frequency.

In the invented system, frequency waves transmitted to the piezoelectric plate are controlled by an oscillator and accordingly, vibration and blowing speed of the piezo are controlled.

With the setting button on the device, the blowing speed can be set by controlling the frequency transmitted from the main power circuit to the piezo.

The vibratory plate which strains and loosens when electric is supplied and which is used in piezoelectric mesh technology has a unique resonance. The plate vibrates at maximum speed when it catches this resonance and blowing becomes the fastest.

In the invented system, resonator was added after the frequency generator and the frequency position can be set with the setting button. The blowing speed can be increased or decreased by changing the wave that reaches the plate.

The frequency transmitted from the main circuit to the piezo can be controlled by the user with a settings button.

CLAIMS

- 1- The invention is related to controlling and directing blowing speed of the nebulizer which turns the liquid medicine into vapor in the form of inhalable particulates, especially in devices using mesh technology, for enabling the medicines with different densities to be taken in duration and amounts determined by the expert physician according to the patient's needs; and its property is the oscillator placed in front of the waves sent by the frequency generator to the piezoelectric plate which forms aerosol medicine particles by micro spraying by straining and loosening with electric, another property is to allow the user to control the amount of output particles by sending waves at desired frequency from the oscillator to the piezoelectric plate, by means of the button on device.

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2016/050226

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61M11/00
ADD.

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)
A61M

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 practicable, search terms used)

EP0-Internal, BIOSIS, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/088364 A1 (RESPIRONICS RESPIRATORY DRUG D [GB]; PRINCE IVAN R [GB]; POTTER RICHAR) 9 August 2007 (2007-08-09) abstract; figures 1-3 paragraph [0029] - paragraph [0030] -----	1
X	WO 2012/056398 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; VERSCHUEREN ALWIN ROGIER MARTIJN) 3 May 2012 (2012-05-03) abstract; figures 1-3 page 7 page 8, paragraph 2 -----	1
X	WO 2011/010282 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; SCHIPPER ALPHONSUS TARCISIUS JOZE) 27 January 2011 (2011-01-27) abstract; claims 1-26; figures 1-5 -----	1



Further documents are listed in the continuation of Box C.



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* Special categories of cited documents :

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Date of the actual completion of the international search

29 November 2016

Date of mailing of the international search report

09/12/2016

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/TR2016/050226

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007088364 A1	09-08-2007	EP 1981656 A1	22-10-2008
		US 2007189919 A1	16-08-2007
		WO 2007088364 A1	09-08-2007

WO 2012056398 A1	03-05-2012	CN 103189087 A	03-07-2013
		EP 2632519 A1	04-09-2013
		JP 2013540555 A	07-11-2013
		RU 2013124802 A	10-12-2014
		US 2014145000 A1	29-05-2014
		WO 2012056398 A1	03-05-2012

WO 2011010282 A1	27-01-2011	AU 2009350114 A1	15-03-2012
		CN 102469956 A	23-05-2012
		CN 102470225 A	23-05-2012
		CN 102472648 A	23-05-2012
		EP 2456359 A1	30-05-2012
		EP 2456493 A1	30-05-2012
		EP 2457065 A1	30-05-2012
		JP 5543592 B2	09-07-2014
		JP 5580415 B2	27-08-2014
		JP 2012533750 A	27-12-2012
		JP 2012533812 A	27-12-2012
		RU 2012106257 A	27-08-2013
		RU 2012106299 A	27-08-2013
		US 2012103085 A1	03-05-2012
		US 2012109575 A1	03-05-2012
		US 2012285447 A1	15-11-2012
		US 2015273164 A1	01-10-2015
		WO 2011010191 A1	27-01-2011
		WO 2011010260 A1	27-01-2011
		WO 2011010282 A1	27-01-2011
