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(54) Title: CONVEYING TUBE SET WITH ADAPTERS FOR DELIVERING VOLATILE LIQUID ANESTHETICS

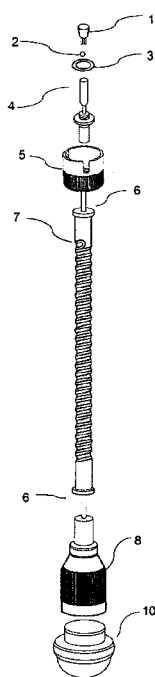


Fig. 1

(57) Abstract: Conveying tube set with adapters for delivering volatile liquid anesthetics, comprises: two adapters namely the first adapter (5) playing a role in a delivering outlet tube connecting to a liquid anesthetics bottle; and the second adapter (8) playing a role in a delivering inlet tube connecting to an inlet port of a vaporizer. The two mentioned (5, 8) adapters tightly attach anesthetics bottle mouth and inlet port of a vaporizer. The second adapter (8) interlocking the vaporizer's inlet port has two patterns: the first pattern directly attaches to an inlet port of a vaporizer; and the second pattern is further interlocked to the first pattern which is the development of the conveying tube set to adapt to various patterns of inlet ports of the vaporizer with only one set of conveying tube set.

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CONVEYING TUBE SET WITH ADAPTERS FOR DELIVERING VOLATILE LIQUID ANESTHETICS

Field of invention

This invention is related to the field of medical engineering, especially relates to a
5 conveying tube set with adapters for delivering volatile liquid anesthetics.

Background of the invention

Nowadays, technology can be accessible by anyone in a fast-growing world of
technology and utilized those technology more easily than ever, resulting in blossoming of
innovation development, and producing cutting-edge medical devices as well as increasing the
10 survival rate of patients after coming to the hospitals where there are a number of professionals,
advanced medical instruments, medicines, and vaccines curing diseases direct to the causes
despite the serious disease. In contrast, the survival rate in the past is much little than the
present because there is no vaccine for protecting curable diseases but performing only
supportive and symptomatic treatment, there is limited number of surgical devices, poor sterile
15 system in the operating room, particularly with no general anaesthetics, but using local and
regional anaesthetic drugs only in the surgical area instead, leading to a huge rate of dead.

In the other hand, development of medical technology for more convenient life is
coming up with the higher cost in medical devices or treatments. Particularly, an anesthetic
drug has to be suitably used for each operation case. For instance, the anesthesiologist has to
20 calculate the most reasonable amount of anesthetic drug for the patient to be senseless or loss of
consciousness during performing an operation. Anesthetic drug is not only used for the general
surgery, but for the plastic surgery which is very popular in the present time such as, laser
surgery, rhinoplasty, chin augmentation, lip reduction, dentistry, and wound repairing on the
face because of its reduced expenses compared to those in the past. For these reasons,
25 anesthetics is more often used now. The anesthetics, playing a role in suppressing the central
nervous system, can be categorized into three groups namely local anesthetics, regional
anesthetics, and general anesthetics. The anesthetizing method comprises spray, injection, and
inhalation which is reliable on symptoms and a doctor. Anesthetic dose is ordered by the doctor
control because there are some defects from using the anesthetics, for example, a patient may
30 not move legs after surgery about 2 – 4 hours together with anuria, back pain, or aches and may
have side effects or bring life-threatening situations what if there is the drug misuse or using the
drug in inappropriate dose. In general, the standardized hospital and clinic usually use

anesthetics together with the medical devices, especially the conveying tube for conveying anesthetics which attaches to the vaporizer to increase safety, certainty in drug dose, and regularity to anesthetize according to the vaporizer, as well as the hygiene of drug use. Anesthetization has to be caution because each patient has different symptoms and allergies.

5 Therefore, it is necessary to be proved the dose by an anesthesiologist who calculates the appropriate drug dose and concentration for calculating appropriate time for performing operation. Normally, when there is the use of the vaporizer, it has to use the conveying tube set to transfer anesthetics from the vaporizer that can be categorized into four types namely the Pour fill type, the Keyed fill type, the Quick fill type, and the Easy fill type.

10 From the problems mentioned above, the anesthetic conveying tube is crucial for using together with the vaporizer. In general, the anesthetic conveying tube is designed for using strictly with only one type of the vaporizer inlet port. There is no an adaptable conveying tube to various types of the vaporizer. The pronounced problem makes a user has to strictly use the conveying set in accordance with one type of vaporizer inlet port bringing high cost of
15 instruments. Most importantly, the problem may be occurred during changing the conveying tube set in particular because each vaporizer has different inlet port size and anesthetic filling method.

Summary of the invention

20 The conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention is a connector device for delivering anesthetics to the vaporizer comprising a stopper covering one end of the first joint, wherein one end of the joint has the same diameter size as that of a conveying tube, and the other end attaches to the first adapter installed to interlocks to a mouth of anesthetic bottle, wherein the conveying tube is in being a cylindrical shape. The other end of the said tube attaches to one end of the second adapter having a
25 helicoidal shape inside able to connect to an inlet port of the quick fill vaporizer or connect to the second joint capable of attaching to an inlet port of the pour fill vaporizer.

The purpose of this invention is to reduce cost and be convenient about a joint resulting in increasing operation effectiveness and improving the vaporizer system management which used to have to change a whole connector set of the vaporizer accordingly. Therefore, the
30 inventor has invented the conveying tube set according to this invention to solve the existing problem that there have been strict using one connector set for one vaporizer type.

Brief description of the drawings

FIG. 1 illustrates one example of parts of a quick fill type of the conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention.

FIG. 2 illustrates one example of parts of a pour fill type of the conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention.

FIG. 3 illustrates one example of the conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention.

Detailed description of the invention

FIG. 1 illustrates one example of parts of a quick fill type of the conveying tube set with adapters for delivering volatile liquid anesthetics. It discloses the connection among parts of the anesthetics bottle in order to deliver anesthetics to an inlet port of the vaporizer. The conveying tube set comprises: a stopper 1 having a deep hole at its center, wherein its another end has at least one pin covering one end of the first joint 4. The stopper 1 is provided to connect to a ball 2 for keeping a conveying tube 7 out from air. The ball 2 is placed in the middle of the first joint 4 for helping delivery of anesthetics. The joint 4 attaches to a gasket 3 being a supporter at the middle of the first joint 4 to prevent the leakage of anesthetics and assist the connection more tightly.

The first joint 4 has a cylindrical shape, wherein its one end tightly attaches to the stopper 1, the other end has the same diameter size as that of the conveying tube 7, and its middle point is in a flat annular shape supporting the gasket 3 playing a part in connecting to one end of the conveying tube set. The other end of the first joint 4 tightly connects to the first adapter 5 having a hole inside and the adapter 5 fits to a mouth of anesthetic bottle. The outer part of the first adapter 5 has at least one groove, but generally, has two grooves, playing a role in a cover. An air pipe 6 is in the form of holed cylinder playing a part in bleeding the air, wherein the air pipe 6 is placed within the conveying tube 7 between the first adapter 5 and the second adapter 8. Most importantly, the conveying tube 7 most suitable for delivering volatile liquid is in a helicoidal shape delivering anesthetics. The other end of the second adapter 8 interlocks to the conveying tube 7, wherein the diameter size of connecting end of the second adapter 8 has the same size as that of the conveying tube 7, and its inside tightly attaches to an inlet port of the quick fill-typed vaporizer. The outer surface of the second adapter 8 has a set of grooves for being more comfortable to handle. In case, there is no connection between the

second adapter 8 and the inlet, one end of the second adapter 8 tightly connects to a cover 10, and the other end has a handle for preventing the anesthetics' evaporation from the conveying tube set.

FIG. 2 illustrates one example of parts of a pour fill type of the conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention. The figure shows the connections among parts of the anesthetics bottle in order to deliver said anesthetics to an inlet port of the vaporizer like those disclosed in the figure 1, wherein the second adapter 8 is provided to have a set of grooves around its outer surface for being comfortable to handle, and having a hole at its inside surface interlocking to the second joint 9. One end of the joint 9 connects tightly to an inlet port of the pour fill-typed vaporizer. In case, there is no connection to the inlet port, the said end 9 connects to a cover 11 and the other end has a handle helping preventing evaporation of anesthetics from the conveying tube set.

FIG. 3 illustrates one example of the conveying tube set with adapters for delivering volatile liquid anesthetics according to this invention. At the beginning, the interlocking of the first adapter 5 to a mouth of anaesthetic bottle, the stopper 1 moves into the anaesthetic bottle. Then, liquid anaesthetic flows through the hole of the stopper 1 with air bleeding before entering the conveying tube 7 that brings said liquid anesthetics flow through the second adapter 8 playing a role in delivering the liquid anesthetics by interlocking to an inlet port of the quick fill typed vaporizer, or tightly connecting to the second joint 9 playing a part in delivering the agent to an inlet port of the pour fill vaporizer. From the two choices of connection above shows the good adaptation ability of the conveying tube set to the two types of vaporizer.

Any modification of this invention may be clearly understood and performed by those experts with skills in the related arts or related fields. This may be subjected to the scope and intent of this present invention as described in the claims attached.

Claims

1. A conveying tube set with adapters for delivering volatile liquid anesthetics comprising a stopper (1); a first joint (4); a first adapter (5); and a conveying tube (7) **characterized in that**

5 - the stopper (1) having a deep hole at its center playing a role in covering one end of the first joint (4);

 - the first joint (4) having a cylindrical shape as a whole and a flat annular shape at its middle point, and the other end of the joint (4) interlocks to the conveying tube (7), as well as the said end of the first joint (4) tightly connects to the first adapter (5) having a
10 hole inside;

 - the conveying tube (7) being a cylindrical tube that tightly connects to one end of the first joint (4); and

 - a second adapter (8) comprising one end interlocking to the conveying tube (7), wherein the inside of the other end of the adapter (8) attaches and detaches to an anesthetic
15 machine.

2. The conveying tube set according to claim 1, wherein the first adapter (5) has preferably two grooves.

3. The conveying tube set according to claim 1, wherein the conveying tube (7) most suitable for delivering volatile liquid is in a helicoidal shape.

- 20 4. The conveying tube set according to claim 1, wherein the one end of the second adapter (8) interlocks to the second joint (9) connecting to an inlet of an anesthetic machine, or tightly connecting to a cover (11).

5. The conveying tube set according to claim 4, wherein the second adapter (8) tightly connects to a cover (10).

- 25 6. The conveying tube set according to claim 1, wherein the first joint (4) has a gasket (3) being a supporter at the middle of the first joint (4).

7. The conveying tube set according to claim 1, wherein the one end of the stopper (1) has two pins playing a part in connecting to a ball (2).

8. The conveying tube set according to claim 1 or 6, wherein the first joint (4) contains the
30 ball (2) in the middle of the first joint (4) during delivering anesthetics.

9. The conveying tube set according to claim 1, wherein the conveying tube (7) contains an air pipe (6) within which is in forms of holed cylinder placed between the air pipe (5) and the second adapter (8).

1 / 3

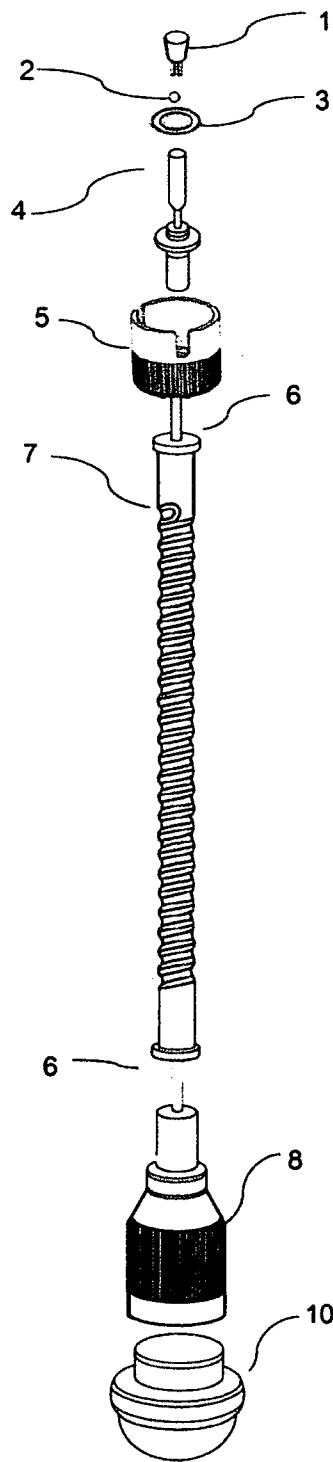


Fig. 1

2 / 3

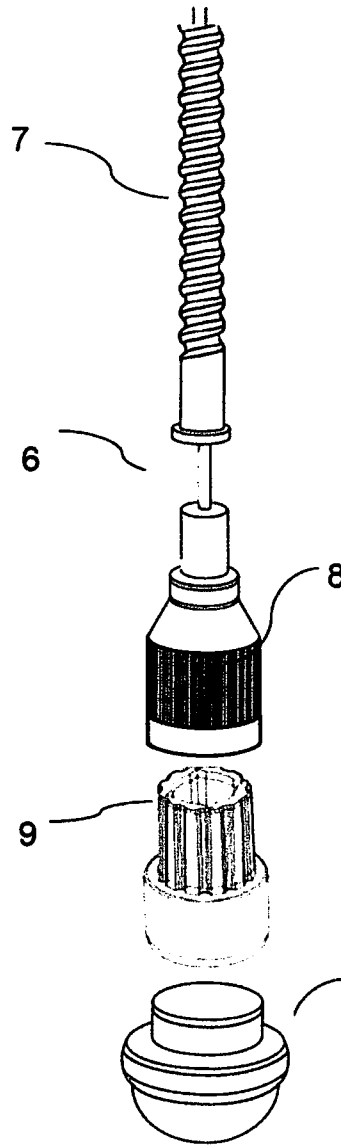


Fig. 2

3 / 3

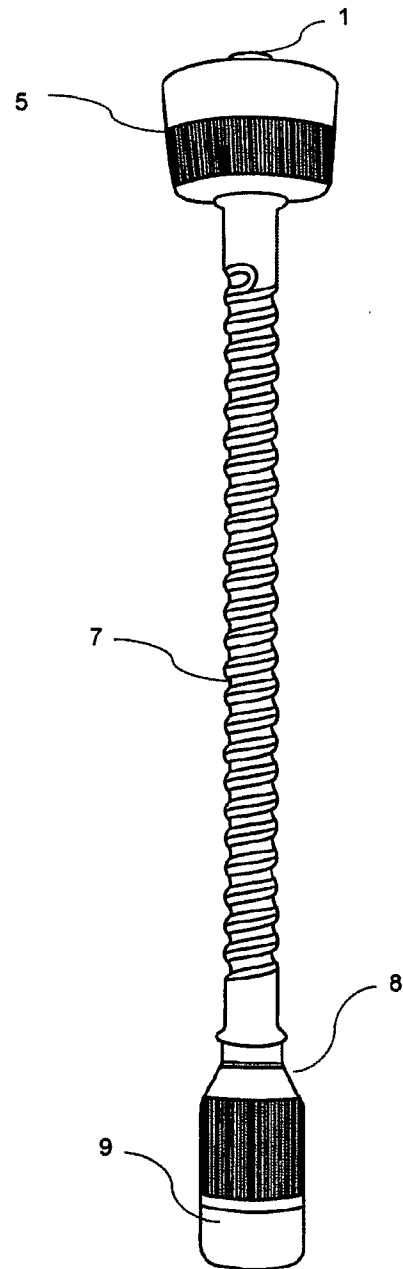


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TH2018/000039

A. CLASSIFICATION OF SUBJECT MATTER

A61M 16/08(2006.01)i

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)

A61M16/-; A61M11/-; A61M25/-

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)

CNKI, CNPAT, EPODOC, WPI: vaporizer, tube, adapter, joint, anesthetic, volatile, connect, convey, deliver, liquid

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9415656 A2 (ABBOTT LAB. ET AL.) 21 July 1994 (1994-07-21) detailed description of preferred embodiment, FIG. 1-3	1-9
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A	CN 204485008 U (UNIV. AFFILIATED HOSPITAL NANTONG) 22 July 2015 (2015-07-22) the whole document	1-9
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A	GB 497113 A (OHIO CHEMICAL AND MFG. COMPANY) 13 December 1938 (1938-12-13) the whole document	1-9
A	US 4621634 A (TRUTEK RESEARCH INC.) 11 November 1986 (1986-11-11) the whole document	1-9

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“&” document member of the same patent family

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Name and mailing address of the ISA/CN

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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