(54) Title: AUTOMATED STETHOSCOPE CLEANER

(57) Abstract: A chamber for sterilising stethoscopes automatically which chamber includes a base above which is located at least one sterilisation unit having at least one support device internal to it which device can accommodate at least one stethoscope and which chamber is provided with means for sterilising at least the head piece and the ear tips of a stethoscope.
Published: with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
AUTOMATED STETHOSCOPE CLEANER

Area of the invention

This invention relates to the area of equipment for medical use and means for cleaning same and in particular to an automated means for cleaning stethoscopes.

Background to the invention

Most stethoscopes used in medical practice are not disposable. They comprise components which include a head piece, having at least one diaphragm capable of transducing sounds, and ear tips for contacting the ears of a user which tips preferably provide an acoustic seal between the ear tip and the ear.

Given that ambient interference can affect the sound transmission characteristics of a stethoscope good contact is required between the tip and the user's ear. It is however important that ear tips be maintained in a clean fashion to resist the transmission of disease between multiple users.

While it is known for ear tips to be removable and cleaned, this practice is far from routine as the cleaning area may be remote, time consuming and be considered generally inconvenient.
Additionally, health care providers use the diaphragm of a stethoscope in contact with successive patient’s bodies thereby permitting the transfer of infection and contaminants between patients. While it is possible to use a cleansing agent such as an alcohol swab to wipe the diaphragm such cleaning procedures are often inadequate to completely destroy contaminants if indeed they are carried out.

In particular, where medical staff repeatedly pass from one patient to the next, such as occurs when a doctor is making hospital rounds or nursing staff are routinely tending patients, the manual effort required to clean a stethoscope for each patient would significantly detract from the time available to examine each patient. The result is that reuse of a stethoscope without sufficient cleaning care being undertaken can result in the transfer of infectious or other organisms between patients.

Outline of the invention

It is an object of this invention to provide an apparatus for automatically cleaning and disinfecting items of medical equipment such as both the head piece and the ear tips of a stethoscope in a sufficiently short time such that the cleansing procedure does not interfere with a health care provider’s ability to examine patients in a timely manner.

The invention is A chamber for sterilising stethoscopes automatically which chamber includes a base above which is located at least one sterilisation unit having at least one support device internal to it which device can accommodate at least one stethoscope
and which chamber is provided with means for sterilising at least the head piece and the ear tips of a stethoscope.

It is preferred that the sterilising means provided in the chamber include both ultraviolet cleaning means and means for physically cleaning a stethoscope, such as an alcohol spray, although any appropriate cleaning means could be used.

It is preferred that the stethoscope support means in the chamber be able to support a multiplicity of stethoscopes. It is further preferred that the chamber be provided at its interior roof with ultra violet light sources which also act to heat the interior of the chamber and consequently the stethoscopes being cleaned.

It is additionally preferred that an alcohol spray source be provided from a container in the floor of the chamber which container is able to be filled and accessed from the exterior of the sterilisation chamber.

It is also preferred that the chamber have a conventional cabinet appearance with a front opening door providing easy access to the stethoscope support either for loading or unloading the stethoscope.

It may also be preferred that the cabinet be able to be wall mounted or bench mounted however the precise mounting can be whatever is desired.

In order that the invention may be more readily understood we will describe by way of non limiting example specific embodiments of the sterilising chamber of the invention.
as applied to the sterilising of stethoscopes with reference to the accompanying drawings.

**Outline of the Drawing Figures**

**Fig. 1** Shows a view of the sterilising chamber cabinet as viewed from the front;

**Fig. 2** Shows an interior view of the chamber cabinet with the stethoscope holder device displayed;

**Fig. 3** Shows a side view of the chamber cabinet with an air vent in its side;

**Fig. 4** shows a schematic diagram of the stethoscope holder device in use;

**Brief Description of the Drawing Figures**

In one embodiment of the invention shown in Figure 1 there is a stethoscope sterilising chamber 10 containing a single sterilising unit 20 and a base 15 which contains the electrical apparatus used to operate the chamber and a timer mechanism. The base 15 also includes a container for alcohol 16, which container is shown withdrawn for filling in Figure 2, the alcohol being able to be sprayed over a stethoscope when in situ in the sterilising unit.
The sterilising chamber of the invention 10 is shown mounted on a frame 40 but could be bench or otherwise mounted as desired. It is also provided with a front opening door 11 with an inspection window 12 which provides a view of the stethoscopes in the unit.

In the interior of the sterilising unit 20 a stethoscope support means 21 is mounted and in Figure 4 a stethoscope 25 is shown positioned over the mount. On the interior roof of the sterilising unit 20 an ultra violet light source 22 is mounted which is used to further disinfect the stethoscopes in addition to cleansing by the alcohol spray.

Such use of ultra violet light in the unit can result in heating inside the unit for which reason the chamber 10 is provided with an air vent 50 on at least one side of the chamber.

While Figure 4 shows only one stethoscope on the support means 21, in fact many stethoscopes can be placed on the support means at any one time. In addition the particular shape of the support means is not germane to the invention and any device which could carry stethoscopes while exposing them to both the alcohol spray and the ultra violet source would suffice.

The sterilising chamber could also utilise any sterilising means which achieves the desired effect of sterilising a multiplicity of stethoscopes within a relatively brief period. In addition the location of sterilising means within the chamber, such as ultra violet light sources could be positioned anywhere within the unit, it is however desirable that the
stethoscope ear tips and head piece diaphragms be able to be both physically cleaned, such as with the alcohol spray, and disinfected by a means such as exposure to the ultra violet light.

While a sterilising chamber with a single unit and a single stethoscope mount is shown in the preferred embodiment of the invention shown here, the invention encompasses a unit with a plurality of stethoscope mounts. The sterilising chamber could also have a plurality of separate sterilising units which could be separately operated if desired.

As previously discussed the precise means whereby the sterilisation is effected may vary however it is envisaged that the provision of a unit capable of swiftly and efficiently sterilising stethoscopes would diminish any possibility of cross contamination between patients and at the very least would protect a medical practitioner from exposure to a contaminated stethoscope through the ear tips.

It is evident therefore that variations in and modifications of the features of the specific embodiments of the invention described herein can be made without departing from the scope of the invention.
The claims defining the invention are as follows:

1. A chamber for sterilising stethoscopes automatically which chamber includes a base above which is located at least one sterilisation unit having at least one support device internal to it which device can accommodate at least one stethoscope and which chamber is provided with means for sterilising at least the head piece and the ear tips of a stethoscope.

2. A chamber as claimed in claim 1 wherein the sterilising means provided in the chamber includes means for physically cleaning the stethoscopes.

3. A chamber as claimed in claim 2 wherein the physical cleaning is effected using an alcohol spray which sprays into the sterilisation unit.

4. A chamber as claimed in claim 3 wherein the alcohol spray originates from an alcohol source located in the chamber base.

5. A chamber as claimed is claim 2 wherein the sterilisation means is provided by an ultra violet light source located on a roof of the sterilisation unit.

6. A chamber as claimed in any one of claims 1 to claim 5 wherein the stethoscope support means in the chamber can support a multiplicity of stethoscopes.
7. A chamber as claimed in any one of claims 1 to 6 wherein the sterilising unit has a wall with an air vent therethrough.

8. A chamber as claimed in claim 1 wherein the sterilisation unit is accessed through a door.

9. A chamber as claimed in claim 8 wherein part of the door is a window through which the interior of the sterilisation unit can be inspected.

10. A chamber as claimed in any one of claims 1 to 9 wherein a plurality of support devices may be located in any one sterilisation unit.

11. A chamber as claimed in claim 10 wherein there are a plurality of sterilising units.

12. A chamber substantially as herein described with reference to the accompanying drawings.

Dated 24th day of May 2002

Kerrie Lee Nominees Pty. Limited
By its Patent Attorneys
A Tatlock & Associates
FIG. 2.
FIG. 4.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. 7: A61L 2/10, 2/18; A61B 19/00

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)
A61L 2/10, 2/18

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)
WPAT JAPPO (IPC as above and keywords)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5641464 A (BRIGGS) 24 June 1997. See abstract, claims and figures.</td>
<td>1-12</td>
</tr>
<tr>
<td>X</td>
<td>WO 99/58021 A (GONZALEZ) 18 November 1999. See abstract and figures.</td>
<td>1-12</td>
</tr>
<tr>
<td>X</td>
<td>US 5135721 A (RICHARD) 4 August 1992. See abstract and figure 2.</td>
<td>1-12</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C

See patent family annex

* Special categories of cited documents:
  "A" Special categories of cited documents:
  "A" document defining the general state of the art
  which is not considered to be of particular
  relevance
  "E" earlier application or patent but published on or
  after the international filing date
  "L" document which may throw doubts on priority
  claim(s) or which is cited to establish the
  publication date of another citation or other special
  reason (as specified)
  "O" document referring to an oral disclosure, use,
  exhibition or other means
  "P" document published prior to the international filing
  date but later than the priority date claimed
  "T" later document published after the international filing date or priority date
  not in conflict with the application but cited to understand the principle
  or theory underlying the invention
document of particular relevance; the claimed invention cannot be
considered novel or cannot be considered to involve an inventive step
when the document is taken alone
document of particular relevance; the claimed invention cannot be
considered to involve an inventive step when the document is combined
with one or more other such documents, such combination being obvious to
a person skilled in the art
document member of the same patent family

Date of the actual completion of the international search
17 June 2002

Date of mailing of the international search report 20 JUN 2002

Name and mailing address of the ISA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustralia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

JAMES DZIEDZIC
Telephone No: (02) 6283 2495

Form PCT/ISA/210 (second sheet) (July 1998)
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5892233 A (CLEMENT) 6 April 1996. See abstract and figures.</td>
<td>1-12</td>
</tr>
<tr>
<td>X</td>
<td>US 5114670 A (DUFFEY) 19 May 1992. See claims and drawing.</td>
<td>1-12</td>
</tr>
<tr>
<td>X</td>
<td>US 4906851 A (BEASLEY) 6 March 1990. See abstract and figures.</td>
<td>1</td>
</tr>
<tr>
<td>X</td>
<td>US 5185532 A (ZABSKY) 9 February 1993. See abstract and figures.</td>
<td>1</td>
</tr>
</tbody>
</table>
This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>US 5135721</td>
<td>AU 72504/91 WO 9110894</td>
</tr>
<tr>
<td>WO 9958021</td>
<td>AU 72171/98</td>
</tr>
<tr>
<td>US 5185532</td>
<td>AU 33314/93 WO 9415198</td>
</tr>
</tbody>
</table>