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METHOD OF REDUCING CROSS CONTAMINATION IN ADMINISTERING
ANESTHESIA AND APPARATUS THEREFOR
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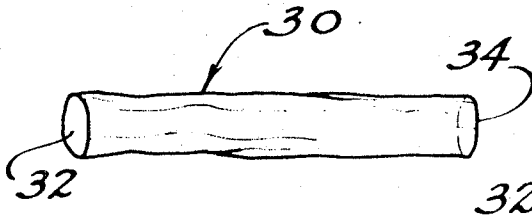


FIG. 1

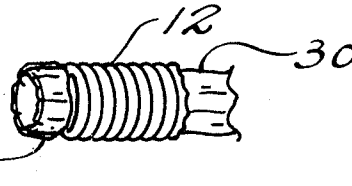


FIG. 2

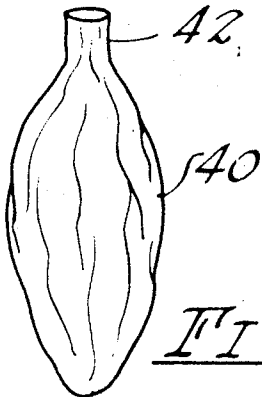


FIG. 3

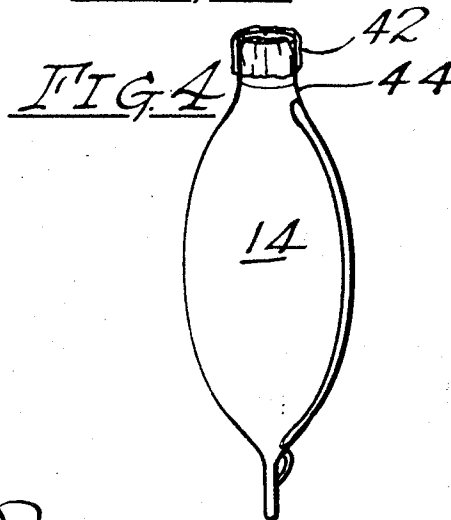


FIG. 4

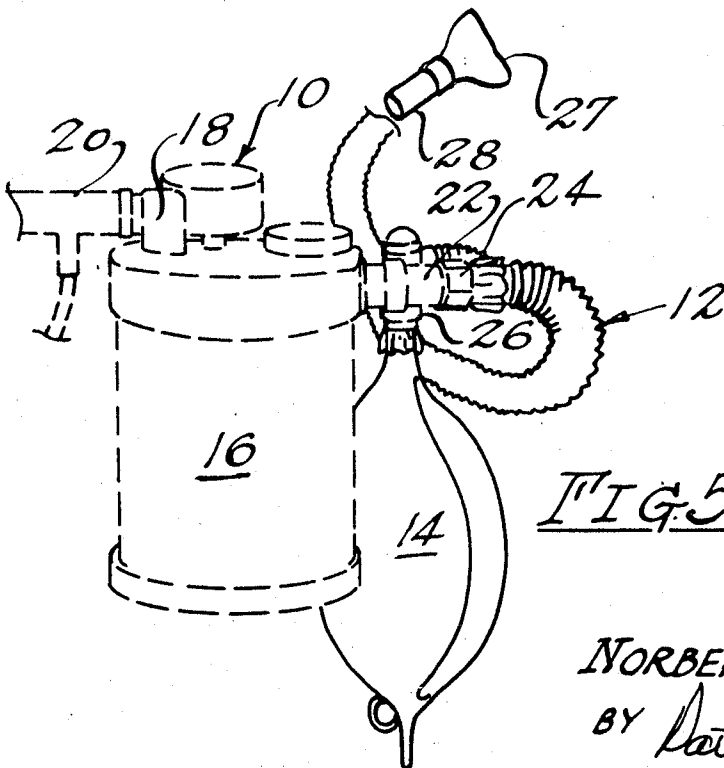


FIG. 5

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1

3,457,920

METHOD OF REDUCING CROSS CONTAMINATION IN ADMINISTERING ANESTHESIA AND APPARATUS THEREFOR

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10 Claims

ABSTRACT OF THE DISCLOSURE

A method for reducing cross-contamination between patients caused by exchange of bacteria from the hose and/or breathing bag of an anesthesia apparatus comprising lining the hose and/or the breathing bag with a disposable lining which is removed between patients. An apparatus for use in the anesthesia system to reduce cross-contamination which includes a flexible hose and a breathing bag comprising an elongated, tubular liner constructed from flexible plastic sheet material such as polyethylene of a thinness of about three to five mils and also a liner constructed from a plastic material of three to five mils thinness and shaped to conform with the inside of a breathing bag and both the liner for the tube and the liner for the bag being long enough to bring outside the respective openings to the tube and the bag and to fold therearound to shield same from bacteria.

Conventional anesthesia breathing apparatus comprises an electrically conductive rubber breathing bag and an electrically conductive pair of flexible hoses which are connected for communication with a face mask. Cross-contamination from one patient to another administered anesthesia from the same apparatus may occur due to the bacteria in the hose and/or the breathing bag even though the system may be flushed with an antiseptic between patients and in spite of some of the breathing bags and hoses being coated or constructed with an anti-bacteria compound. Any method or apparatus which reduces the chance of cross-contamination between patients is a significant contribution when one considers that life is at stake and is especially welcome if it is inexpensive and easy to use.

With respect to reducing the chances of cross-contamination, the prior art has provided bacteria inhibiting substances in the material from which the rubber tubes and bags were made and such as one approach of the prior art to a solution of this problem. Another approach is the complete flushing of all of the equipment between patients, using various gases and chemicals in an attempt to destroy the bacteria that may be in the system or to remove it from the system by flushing. Chemical bacteria inhibitors in the material itself are of limited value. The cleansing or flushing of the system between patients is time consuming and also is only partially effective in removing the bacteria from the system. The present method and apparatus is better in that it is quicker and more effective in eliminating more bacteria than the prior art methods and apparatus and is much faster than a complete flushing of the system. In addition, the present method and apparatus is less expensive than the prior art methods for comparable results and is quicker to use in busy operating rooms. Furthermore, the present apparatus in addition to the bacteria inhibiting procedure also may be used to smooth the flow and reduce back pressure inside the tube and to control the elongation of the tube to prevent any unwanted stretching of the rubber hose.

2

Generally described, a typical anesthesia is delivered to the patient in the usual manner through a flexible hose and through a rubber face mask into the patient's breathing system and there may be a breathing bag made from rubber. The flexible hose is usually corrugated and will stretch, both when wanted and unwanted. The entire apparatus is usually electrically conductive in an attempt to reduce explosion. According to the present method, between patients using the same equipment to be anesthetized, the hose is removed from the hose fittings and a thin lining material is inserted into the hose to line the interior thereof. Optionally the hose lining may be brought around the outer periphery of the hose prior to installation on the hose fittings. The breathing bag is removed from the breathing bag fitting and lined with a smooth lining material and following use by each patient the linings of the hose and breathing bag are discarded and replaced with clean lining material.

In one form of the present invention, for the anesthesia apparatus hose a flexible sleeve or tube such as a thin acceptably electrically conductive polymer plastic or latex material is constructed, for example, by forming the tube around a mandrel to create a continuous unbroken sleeve corresponding substantially in diameter with the diameter of the hose and being slightly longer than the hose so that the sleeve may be brought out of the hose and turned back around the ends of the hose to cover same. In like manner, the liner of the bag is molded, blow molded, or tape sealed from two pieces into a shape and size substantially the same as the bag or made from blown film. The liner may be folded on itself several times and then inserted through the neck of the bag and may be slightly longer at its neck than the bag so that it may be turned back around the end of the neck of the bag to cover same.

A primary object of this invention is to provide a disposable lining for anesthetic equipment which, among other things, protects the rubber hose from deteriorating anesthetic chemicals.

Another object of this invention is to provide a method for preventing cross-contamination between patients using the same anesthetic equipment comprising lining certain parts in the equipment and then disposing of same after each patient.

Another object of this invention resides in the inexpensive construction of the linings each of which may be made from a light weight, thin and inexpensive plastic or other material.

Another feature of this invention resides in the lining of a corrugated anesthesia hose with a smooth, unbroken sleeve to reduce the turbulent flow which had existed in the corrugated construction and to change it to a more laminar flow and also to reduce back pressure, and to accomplish a similar result by lining the breathing bag with a disposable liner.

Still another important advantage of this present method resides in the speed and facility with which the system may be cleansed by changing the internal linings of the hose and bag.

Other and further objects of my invention will become apparent upon reading the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a disposable plastic anesthetic hose liner made in accordance with the present invention.

FIG. 2 is a perspective view of the plastic liner of FIG. 1 inserted into a typical anesthesia hose.

FIG. 3 is a perspective view of a disposable plastic bag liner made in accordance with the present invention.

FIG. 4 is a perspective view of the plastic bag liner of

FIG. 3 inside a typical anesthesia bag and having the neck folded around the neck of the bag.

FIG. 5 is a perspective view of a portion of a typical anesthesia apparatus having the lined hose and the lined bag of FIG. 4 positioned in place in the apparatus.

Anesthesia apparatus and accessories vary from one manufacturer to the other. In addition, some anesthesiologists rig up their own equipment combining different apparatus and accessories obtained from different sources. The present invention applies to any anesthesia apparatus which uses a hose and a bag and may optionally use some type of absorber having a canister. There may be several hoses connected to a valve and face mask and to an absorber. In the present drawings, referring initially to the assembled view of typical anesthesia apparatus shown in FIG. 5, the assembled equipment is designated generally by reference numeral 10 and comprises a flexible corrugated hose 12, a flexible, rubber bag 14, an absorber canister 16, a canister inlet 18, a canister inlet fitting 20, a canister outlet fitting 22 to which one end of hose 12 is tightly and detachably connected on a pipe nipple 24 and to which fitting 22 the bag 14 is attached to a pipe nipple 26. The other end of hose 12 is removably connected to a mask 27 fitting 28 which is normally held over the patient's face to deliver the gas vapor. It is to be understood that the specific construction of the hose 12 is substantially immaterial to the present invention and so is the construction of the bag 14 which is usually made from flexible rubber that is sealed airtight. Also, as mentioned previously, the apparatus 10 may vary in the size, shape and characteristics of the canister arrangement 16, including the contents and the like which per se form no part of this invention.

Referring to FIG. 1, a tubular, flexible, continuous disposable tube or sleeve 30 is constructed from a thin, flexible and tough material such as polyethylene or polymer sheet plastic which may be electrically conductive and formed in the shape of a continuous closed tube having open ends at 32 and 34. Tube 30 may be manufactured by any well known plastic manufacturing process such as blow molding or blown film technique, stretching a piece of sheet plastic on a mandrel or tube forming member sufficiently to elongate same in a closed fashion to create the elongated tube shown in FIG. 1. A plastic sheet between 1 mil and 10 mils and preferably of a thinness of about three to 5 mils is acceptable. Tube or sleeve 30 may be made in many different sizes and many different degrees of length. Since there are anesthesia hoses of standard lengths for most of the equipment it will usually suffice to make this sleeve in a number of standard sizes. It is preferred that the sleeve 30 be longer than the hose 12 to which the sleeve is fitted so that the end of the sleeve as seen in FIG. 2 will extend beyond the end of the hose and the end of sleeve 32 is folded back around the end of hose 12 to completely shield the hose 12 from contents of the interior. Then the fitting 24 may be applied and attached in place and the hose 12 has been sealed. In like manner the other end 34 of the sleeve 30 is fitted to the end of hose 12 at fitting 28 and turned around the end of the hose prior to being attached to the mask fitting 28 so that the end 28 of the hose 12 is completely isolated or shielded.

The breathing bag 14 receives the removable, disposable plastic liner 40 shown in FIG. 3. Plastic liner 40 is preferably constructed from a thin plastic sheet such as polyethylene or a polymer which may be molded or blown or blow molded into the shape of the interior of bag 14 or may be made from two pieces of plastic sheet cut to a pattern and sealed along the edge to make the bag 40 shown in FIG. 3. The neck 42 of bag 40 is somewhat longer than the corresponding neck 44 of the bag 14 so that the neck 42 of the bag 40 extends beyond the neck 44 and is turned around and bent over the neck 44 of bag 14 thereby sealing the neck of the bag from contact when the bag 14 is attached by fitting 26.

Since bacteria can be transferred from the hose or bag in an ordinary anesthesia apparatus from one patient to the other, the advantage of the present system, method and apparatus will be apparent. The disposable sleeve 30 may be placed in the hose 12 and the disposable bag 40 may be placed in the bag 14 between patients, that is, for each new patient. After the operation on that patient is completed, the anesthesiologist will remove the neck 44 of bag 14 and the ends of hose 12 and remove and dispose of the lining sleeve 30 and bag liner 40. The replacement sleeves 30 and bag liners 40 may be kept in a sterile condition and inserted quickly and easily in place. In addition to the cleanliness and sterile value of the replacement, the liner 30 can be fitted to a particular length in the hose 12 and can determine to some extent the maximum elongation of the hose 12 thereby controlling elongation. Elongation of a hose during an operation can be a problem and the present sleeve 30 can be used to prevent unwanted stretching. In addition, normally the flow of the vapor or gas inside the hose 12 is in a turbulent manner due to the broken interior caused by the corrugations of the hose. However, the sleeve 30 corrects this turbulence to a large extent by creating a laminar or smooth flow inside the tube 12 which tends to reduce the turbulent flow of vapor as it enters the mask on the patient's face. There is a better control of volume and pressure due to the better control of the elasticity. For example bagging a patient by hand manipulation of the breathing bag is made easier by the present liner reducing the flexing or distention of the hose. Furthermore, if it is desired a bacteria inhibiting agent can either be incorporated into the plastic sleeve 30 during manufacture and the bag liner 40 or the plastic sleeve 30 and the bag liner 40 can be coated with such a chemical coating.

What is claimed:

1. In a method for reducing bacteria transfer between patients receiving anesthetics from the same anesthesia apparatus which comprises a face mask to which is connected a flexible hose and which may be connected with a canister arrangement and breathing bag receiving a conventional anesthetic vapor, the improvement in the method comprising the steps of: removing the ends of the hose from the equipment after each patient, lining the interior of the hose with a smooth lining, and replacing the hose on the equipment between patients.

2. The improvement in claim 1, wherein: the breathing bag is removed to remove the neck thereof from the equipment, the interior of the breathing bag is lined with a clean liner and the breathing bag is reattached to the equipment.

3. In an apparatus for use in reducing cross-contamination between patients receiving an anesthetic from a conventional anesthesia apparatus which includes a flexible hose detachably attached in communication with a face mask and having the other end of the hose attachably connected to the anesthesia apparatus such as an absorber canister, the improvement comprising: a flexible, elongated, smooth, thin-walled removal sleeve inserted in such flexible hose and being detachably positioned therein as a removable liner which may be removed and replaced between patients.

4. The improvement recited in claim 3, wherein: said sleeve is made from a thin plastic material.

5. The improvement recited in claim 4, wherein: said plastic sleeve is of a thickness between one mil and ten mils and is longer than the hose to which it is attached, the ends of said plastic sleeve being folded around the respective open ends of said hose where it is removed from the anesthesia apparatus to seal the end of the hose from the apparatus when it is replaced therein:

6. The improvement recited in claim 3, wherein: the apparatus includes a rubber breathing bag having the neck thereof detachably attached to the anesthesia apparatus and wherein there is a removable and replaceable liner for said breathing bag.

5

7. The improvement recited in claim 6, wherein: the removable and replaceable liner for said breathing bag is a closed bag made from plastic sheet material or the like which has an open neck, said bag being insertable in and removable from said breathing bag to provide a replaceable lining.

8. The improvement claimed in claim 7, wherein: said bag is made from a material of thin construction, and the neck of said lining bag is longer than the neck of said breathing bag so that said lining extends from said bag and is folded around the neck of said bag to cover and protect same when attached in place on said anesthesia apparatus.

9. The improvement in claim 8 wherein: said bag material is approximately from 1 to 10 mils in thickness.

10. The apparatus in claim 7 wherein said apparatus is electro-conductive by making the hose plastic sleeve and bag liner of an electrically conductive material.

6

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