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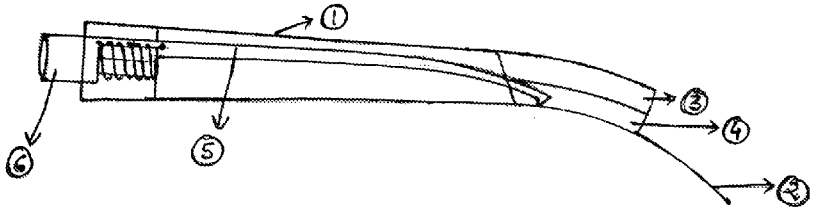
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(54) **Title:** FLEXI - TRAQ.

Figure 1 Longitudinal section (left side)



(57) **Abstract:** The present invention provides an alternative cost effective modified laryngoscope for intubation in all difficult airway situation with added advantage of its distal flexible tip with real time vision with suction and oxygen channel It consists up of scope body (1), distal flexible tip (2), H D camera with antifogging (3), suction/oxygen channel and inlet (4), hinge (5) and a tip deflector/ spring button (6). Thus it helps in intubating any difficult airway situation where routine use of other laryngoscope is not possible while maintaining the sterility of the endotracheal tube. Many other advantages of the invention will be apparent from reading the description which follows in conjunction with the accompanying drawings.

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FIELD OF INVENTION :

This invention relates to a modified laryngoscope which is characterized by distal flexible tip with real time vision along with suction and oxygen port.

BACKGROUND AND PRIOR ART OF INVENTION

The expression `orotracheal tube_generally designates an endotracheal tube that is inserted through the mouth. Orotracheal intubation consists in inserting a tube through the mouth, the laryngeal inlet and into the trachea of a patient. This procedure is commonly performed in medical conditions in patients who are unable to protect their airways, are at risk of pulmonary aspiration and those that require assistance with mechanical ventilation. It is also commonly performed to permit safe general anaesthesia to enable mechanical ventilation during surgery.

A laryngoscope assists with intubation by allowing the clinician to visualise the path of the endotracheal tube as it passes through the glottis towards the trachea. Tracheal intubation can be performed by direct laryngoscopy or indirect laryngoscopy.During direct laryngoscopy, a laryngoscope is used to obtain a direct view of the vocal cords. An orotracheal tube is inserted under direct vision through the vocal cords normally in an unconscious patient. A laryngoscope typically comprises a handle and a blade. There are many types of laryngoscopes designed for direct laryngoscopy. The blade may be curved (e.g. the Macintosh blade), straight (e.g. the Miller blade) or may comprise a moveable hinged blade tip (e.g.McCoy laryngoscope).

The technique of orotracheal intubation begins with the blade inserted into the right corner of the patient's mouth. The blade is shaped such that a flange will push the tongue to the left side of the oropharynx to create space in the oropharynx through which a view of the larynx will be sought. The epiglottis is visualised. The laryngoscope handle is manipulated so that the blade lifts the epiglottis directly with the straightblade or indirectly with the curved blade thereby exposing the laryngeal inlet in normal patients. The endotracheal tube is then advanced past the vocal cords into the trachea.

Most intubations are straightforward using the direct laryngoscopy procedure described above. However some patientsare known to be difficult to intubate under direct laryngoscopy, especially if there are anatomical abnormalities or if the larynx lies particularly anteriorly. Other patients are unexpectedly found during direct laryngoscopy to be difficult to intubate this way. Intubation of these patients may be more successful using indirect laryngoscopy. This can be performed using a videolaryngoscope such as those sold under the trademarks Airtraq and GlideScope. These videolaryngoscopes have a light source and imaging modality embedded in or inserted near to the distal portion of the blade. The blade is shaped such that with manipulation the imaging modality can be positioned adjacent to the larynx. This enables

visualization of the laryngeal inlet on a viewer or screen. Fibreoptic intubating laryngoscopes are also used for intubation, particularly if direct laryngoscopy is judged to be difficult or dangerous.

Reference can be made to the work of Young et al. United states patent number (US 8,814,786 B2)who made a guiding device for use with a laryngoscope for assisting in the insertion of an endotracheal tube into a patient, the devicecomprising a guiding means for guiding an endotracheal tube through the patient˘ s upper airways, and an attachment means to attach the guiding means to the blade of the laryngoscope.

DISADVANAGES OF THE ABOVE MONITORING DEVICES :

Various laryngoscopes are available today but the greatest disadvantage of all is that their blades are anatomically curved and are rigid hence their use in difficult airway situation where each individual airway anatomy varies, is problematic. Also the hyperdynamic response during intubation because of lifting of epiglottis preclude its use in hypertensive and heart disease patients. This same problem also occurs with the video laryngoscopes.

While using a videolaryngoscope when the user attempts to insert an endotracheal tube, the tip can be visualised on the screen as it passes through the larynx. It is common however with videolaryngoscopes for a good laryngoscopic view on the screen to be achieved but for the user to have difficulty directing the endotracheal tube into the laryngeal inlet. Most problematic is the endotracheal tube tip directing too posteriorly. A stiff introducer or bougie can be inserted into the endotracheal tube to try to overcome this difficulty but this adds complexity and risk to the procedure. Some videolaryngoscopes, for example the Airtraq÷ , have an insertion technique completely different to that used in direct laryngoscopy and have an open sided rigid channel to help guide the tube. A disadvantage of these rigid open sided channels is that the endotracheal tube is not placed with a technique similar to direct laryngoscopy which is familiar to all anesthesiologists. Another disadvantage is that depending upon tube diameter used, the tube tip is not always gripped sufficiently to direct it along the blade in a sufficiently anterior direction. Another disadvantage is that the rigidity of the guiding channel can impede the removal of the laryngoscope over the endotracheal tube when intubation has been achieved and the laryngoscope needs to be removed.

The use of fibreoptic for intubation also have many disadvantages . Firstly they are very costly and not easily available in all hospitals. Also its use requires a long learning curve. Since it is made up fibreoptic bundles which are very fine and any break in the bundle due to biting by the patient teeth during the procedure can damage it. While intubation fibreoptic passes through either oral cavity or nasal cavity which are the most unsterile areas so in this way we transmit infection to the lungs

ADVANTAGES OF THIS INVENTION :

1. The flexible tip is incorporated with HD camera with antifogging mechanism which helps in situation where the laryngeal inlet is either anterior or posterior so by just adjusting the tip we can have a clearer vision of the laryngeal inlet and better alignment for the passage of the tube.
2. The flexible tip is also incorporated with suction and oxygen channel . Suction channel helps in aspirating any secretions in the form of blood, saliva,or gastric content, hindering the camera view, while the oxygen channel provides continuous source of oxygen during the intubation procedure .
3. Bite block present at the proximal end of the modified laryngoscope helps in preventing the instrument getting damaged due to biting.
4. Sterility of the endotracheal tube is maintained during intubation as the tube is covered in its entirety by the scope body.
5. The modified laryngoscope doesnot require lifting of epiglottis hence no hyperdynamic response therefore best in patients with hypertension or heart disease .

OBJECTS OF THE INVENTION :

The main object of this invention is to give a modified laryngoscope for intubation which can be used in all airways especially difficult airway

DETAILED DESCRIPTION OF INVENTION :

Figure 1 is a longitudinal section (left sided view) of the modified laryngoscope. It shows the different component of the apparatus which consists of scope body(1), flexible tip(2), HD camera with light source with antifogging(3), suction / oxygen dual port(4), hinge (5), tip deflector/ spring button (6).

Figure 2 is also a longitudinal section (right sided and superior view) of the modified laryngoscope. It shows different component of the apparatus which consists up of scope body(1), endotracheal tube inlet(7), distal flexible tip(2) .

Figure 3 is the front view of the device showing scope body(1), flexible tip(2), HD camera with light source with antifogging(3), suction / oxygen dual port(4), endotracheal tube inlet(7).

Figure 4 is the superior aspect of the device showing scope body(1), flexible tip(2), suction / oxygen dual port(4), endotracheal tube inlet(7), hinge (5),tip deflector/ spring button(6).

A single embodiment of the invention has been described herein. Many variation could be made without departing from the spirit of invention.

All sizes are available which can be used in patients of variable age.

CLAIMS

1. It's a modified laryngoscope for intubation which can be used in all airways especially difficult airway because of its flexible nature of the scope body which can be bend anteriorly.
2. Modified laryngoscope as set forth in claim 1 in which the distal flexible tip helps in moving anteriorly upto 90 degree .
3. Modified laryngoscope as set forth in claim 1 in which the distal flexible tip incorporates real time high definition camera along with antifogging mechanism.
4. Modified laryngoscope as set forth in claim 1 in which the distal flexible tip incorporates suction channel for aspirating any secretions.
5. Modified laryngoscope as set forth in claim 1 in which the distal flexible tip incorporates oxygen channel for continuous supply of oxygen during the procedure.
6. Modified laryngoscope as set forth in claim 1 in which the endotracheal tube is covered throughout its whole length by the scope body hence maintaining sterility.

Figure 1

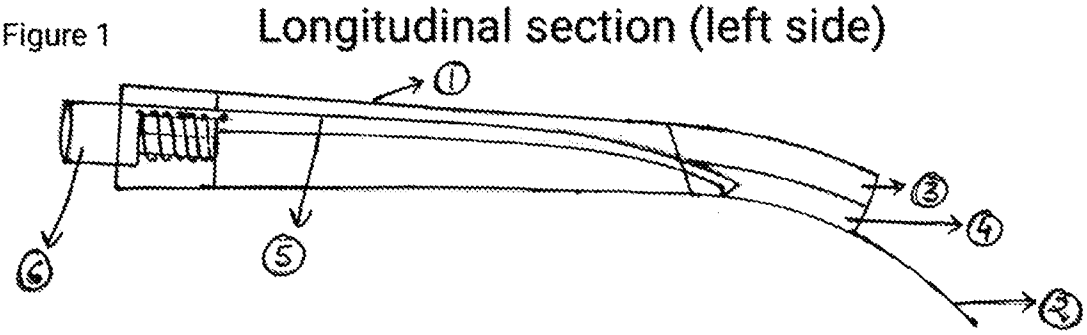
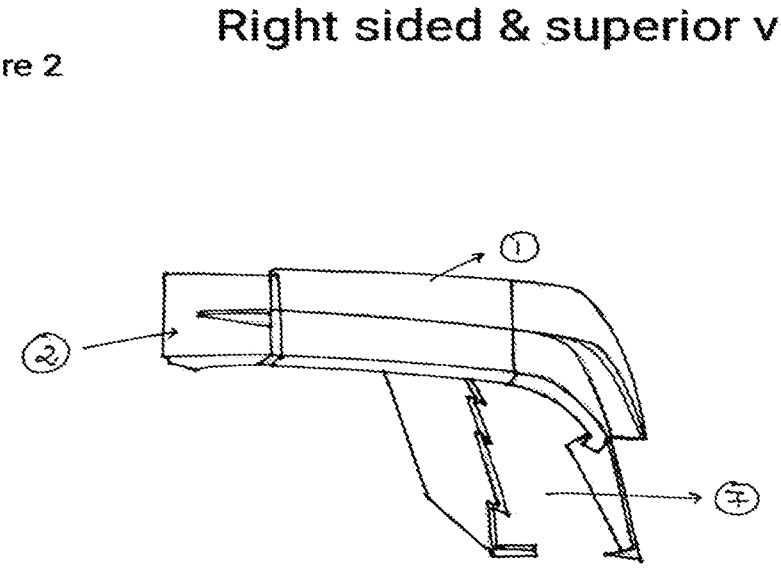


Figure 2



Front view

Figure 3

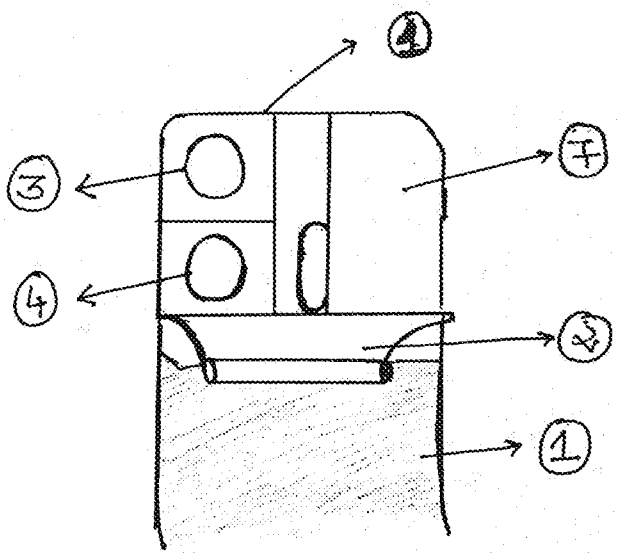
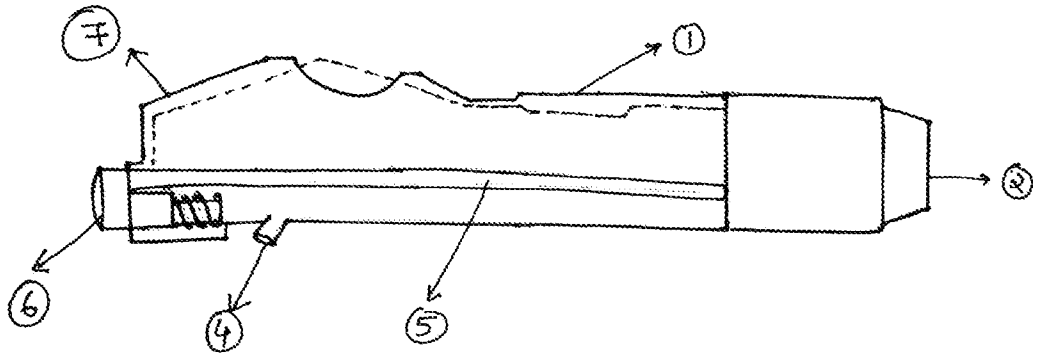


Figure 4

Superior view



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
A61B1/267 Version=2018.01

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)

A61B

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)

TotalPatent One, IPO Internal Database
Keywords: Laryngoscope, flexible, camera, suction, sterility

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	IN201621038875A (DR. KOTAK NIRAV M (IN)), 25 November 2016 (25.11.2016) Abstract, Description, Claims 1-6	1-6

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

* Special categories of cited documents:
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