National Institute of Technology Calicut

Emergency Ventilator with Exhale Disinfector

A Non-invasive Emergency ventilator with exhale disinfector has been developed by **NIT Calicut team** led by Dr. Sajith V, Head of School of Materials Science and Engineering (SMSE), modifying the basic model developed by Mr. Arun Kumar, an Incubatee of **Technology Business Incubator of NIT Calicut**. This team also includes Mr. Anandan K R, Senior Mechanic, Dept. of Electronics & Communication Engg, NIT Calicut.

Mr. Arun Kumar was in the process of making a set up for testing the Nasal air filters (a product under funding from Technology Business Incubator of NIT Calicut) being developed at Applied Nano Engineering Lab of SMSE, which has been modified to Emergency Ventilator system. Emergency ventilator, a breathing aid for the patients experiencing the difficulty in breathing, basically uses an Ambu bag. The operation of the Ambu bag has been made automatic by means of a suitable motor drive. A specifically designed electronic control circuit is used to control the speed of the motor, thereby varying the breathes per minutes depending upon the condition of patients, which will be displayed in the unit. A provision is also made for adjusting the tidal volume by varying the stroke of the motor, mechanically. The control of peep pressure, which is a critical factor while ventilating the corona patients with Acute Respiratory Distress Syndrome (ARDS), is made possible by an inbuilt valve.

The exhaled air of corona patients using noninvasive ventilators will be infected and needs to be filtered before expelling to atmosphere. Expensive filters are generally used for this purpose. In the Emergency Ventilator developed by NITC, the exhaled air of the corona patient is bubbled through soap solution to disinfect it, which is a unique feature of this product. Disposal of conventional viral filter, which contains viruses, being a major challenge, the use of soap solution-based exhale disinfector is a simple solution. The exhale disinfector can be reused, reducing the operational cost of the respirator. Aerosol box already developed by NITC, when used along with the ventilator can control the spread of the viruses in the air.

The prototype of ventilator was demonstrated to Doctors of Govt. Medical College Kozhikode and based on their suggestions the prototype is being modified to the final stage. NITC team is also working on mechanism for automatically varying the breath rate of the respirator using an automatic patient feedback system. Dr. Kuriakkose, Head of Cardio Thoracic and Vascular Surgery Department, Dr. Vineeth Gladson, Dept. of General Medicine,

Ms. Indira P, and Mr. Nabeel from Dept. of Bio Medical Engg., were also part of the team from Govt. Medical College Kozhikode.

The components used for this product are readily available in the market and the cost of the product will be around Rs. 7000/- only. The emergency ventilator is basically a DIY (Do It Yourself) type, which can be easily assembled locally. This non invasive ventilator can also be used for patients during the transportation.

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