Patent Search

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Inventor

Name	Address	Country	Nat
Mummina Vinod	Dept. of Mechanical Engineering, Vishnu Institute of Technology, Vishnupur, Bhimavaram, West Godavari District, Andhra Pradesh 534202	India	Indi
Tula Durga Shiva Sai Subrahmanyam	Dept. of Mechanical Engineering, Vishnu Institute of Technology, Vishnupur, Bhimavaram, West Godavari District, Andhra Pradesh 534202	India	Indi
Danduprolu Hari Chandu	Dept. of Mechanical Engineering, Vishnu Institute of Technology, Vishnupur, Bhimavaram, West Godavari District, Andhra Pradesh 534202	India	Indi
Yarlagadda Sunethra	Dept. of Mechanical Engineering, Vishnu Institute of Technology, Vishnupur, Bhimavaram, West Godavari District, Andhra Pradesh 534202	India	Indi
Maddipati.Jishnu Varsha	Dept. of Mechanical Engineering, Vishnu Institute of Technology, Vishnupur, Bhimavaram, West Godavari District, Andhra Pradesh 534202	India	Indi

Applicant

Name	Address	Country	Nation
Vishnu Institute of Technology	Sri Vishnu Education Society, Kovvada Rd, Vishnupur, Kovvada, Andhra Pradesh 534202	India	India

Abstract:

The present invention discloses an automated oxygen-enhancement system that integrates real-time physiological monitoring with adaptive oxygen generation and mech assisted ventilation. The system includes a pulse oximetry sensor configured to measure blood oxygen saturation and heart rate, an Arduino microcontroller programmed closed-loop control algorithm, an electrolysis-based oxygen generation module, and a slider–crank breathing-assist mechanism driven by a motor actuator. Based on continuously sampled physiological data, the microcontroller regulates oxygen output and ventilation parameters to maintain safe and adequate respiratory support. A pc supply unit provides regulated electrical input, while a safety monitoring unit detects abnormal operating conditions. The invention offers a low-cost, autonomous respirat support solution suitable for emergency care, low-resource settings, and home-based therapy.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention relates generally to the field of medical devices and respiratory-support technologies, and more particularly to an automatic oxygen enhancement system capable of dynamically regulating oxygen delivery based on real-time physiological feedback. The invention concerns an integrated apparatus comprising an Arduino-based control unit, a MAX30100 pulse oximetry sensor, an electrolysis-driven oxygen generation module, and a mechanically actuated breathing-assist mechanism employing a slider-crank arrangement. The disclosed system provides adaptive respiratory assistance by automatically adjusting oxygen flow in respor to variations in blood oxygen saturation, thereby ensuring personalized and efficient therapeutic support. The invention is applicable to emergency care, critical-care settings, and home-based respiratory therapy, particularly in situations involving shortages of conventional ventilators or limited access to medical oxygen infrastructure

BACKGROUND OF THE INVENTION

[002] Respiratory illnesses, cardiopulmonary disorders, and infectious diseases that impair lung function frequently require external oxygen supplementation to maintai adequate blood oxygen saturation in patients. Conventional oxygen-delivery systems, such as oxygen cylinders, concentrators, and ventilator-based assistive devices, are widely used in clinical settings. However, these systems typically deliver oxygen at a fixed rate or rely on manual adjustment by healthcare personnel. Such static or manually regulated systems fail to respond dynamically to fluctuations in a patient's physiological condition, resulting in periods of under-oxygenation or unnecessary

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