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(54) **METHOD AND APPARATUS FOR CONTROLLING A MEDICAL VENTILATOR**

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(57) **ABSTRACT**

An open- or closed-loop method and corresponding medical ventilator for providing breathing gas to a patient such that the patient exerts a desired work of breathing during pressure support ventilation, and such that the work of breathing of the patient is monitored and the pressure and/or flow rate of the breathing gas provided to the patient is controlled throughout the inspiratory phase to provide a pressure support ventilation level that provides the desired work of breathing in the patient. The medical ventilator includes at least a pressure sensor and a flow rate sensor, disposed in a functionally open ventilator conduit in fluid communication with the lungs of the patient, electrically coupled to a microprocessor to monitor the average respiratory muscle pressure of the patient and to predict the patient work of breathing as a function of the current value of the average respiratory muscle pressure of the patient, to detect when the patient work of breathing is not within a predetermined work of breathing range, and to generate a response signal thereof. Further, the medical ventilator has a driver circuit electrically coupled to the microprocessor and to an actuator of a pneumatic system which, responsive to the response signal, may adjust the selected pressure support ventilation level of the breathing gas provided to the patient by the ventilator until a pressure support ventilation level is reached such that the patient work of breathing is within the predetermined work of breathing range.

45 Claims, 12 Drawing Sheets

