Ventilator – High Flow Crossover Tee

Around 2008 I co-invented a simple device that would allow the use of high-flow therapy (HFT) respiratory support on intubated patients. This would allow a patient that was intubated and on a ventilator to be stepped down to a high-flow device for patients that might be ready to breathe on their own, while still intubated, in case things did not go well off the ventilator. The patent was mostly on the algorithms for monitoring ventilator rate and predicted tidal volume. High flow therapy allows for the delivery of heated humidified respiratory gases, but does not drive respiration, leaving that to the patients. Thus type-L COVID patients[1] might benefit from HFT. Intubation with HFT might be an intermediate step between nasal HFT and ventilator support. US Patent: 9,878,119, 8,220,458, https://patents.google.com/patent/US9878119B2

Here is a simplified cross-section image of the tee. The HFT flows into the inlet port 520/902. The ET tube 510/906 fits to the tee, and exhaled breath and excess flow from the HFT unit vents out at 520/904 and a pressure monitoring port shown in 920.

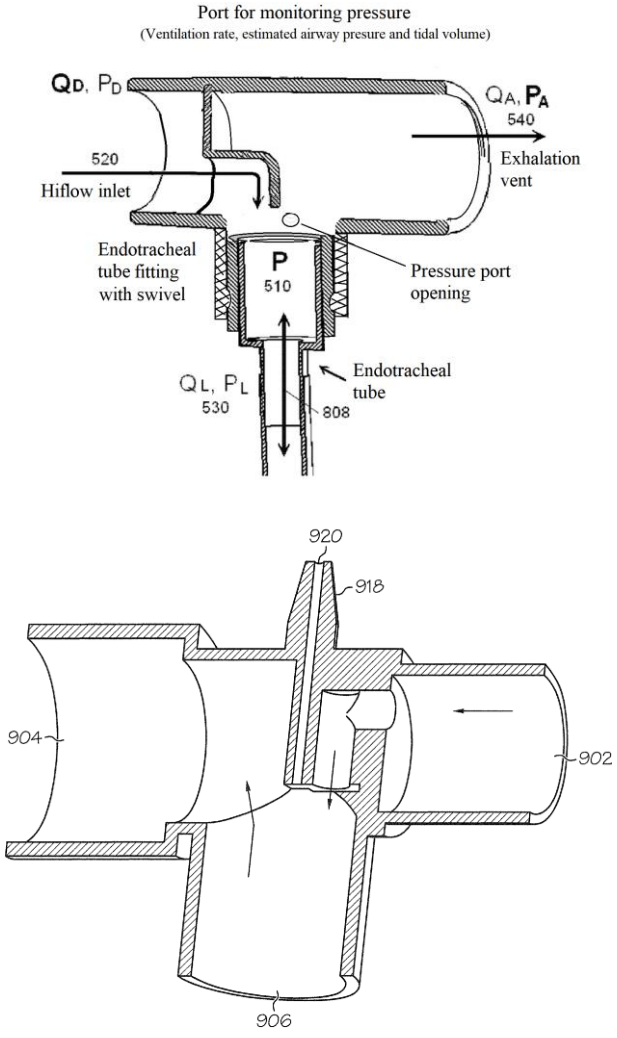

FIG. 10

In a more complete form, the tee has a ventilatory restriction valve on the outlet port. It can be "tuned" to increase PEEP. The valve has a flexible membrane so that if the equipment fails, the patient can inhale room air.

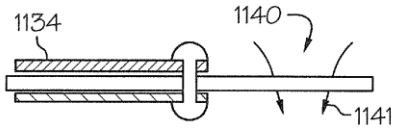

FIG. 13E

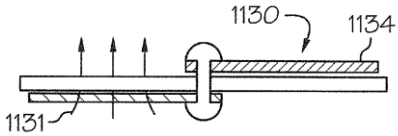

FIG. 13A

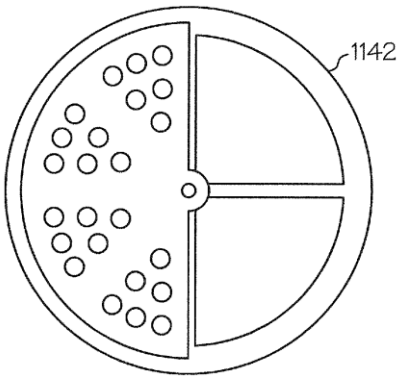

FIG. 13F

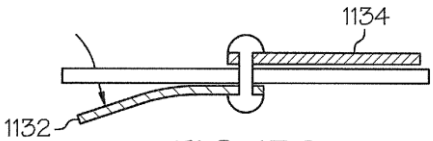

FIG. 13B

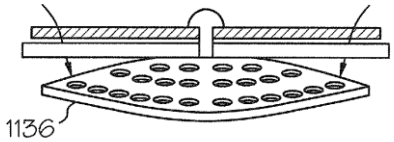

FIG. 13C

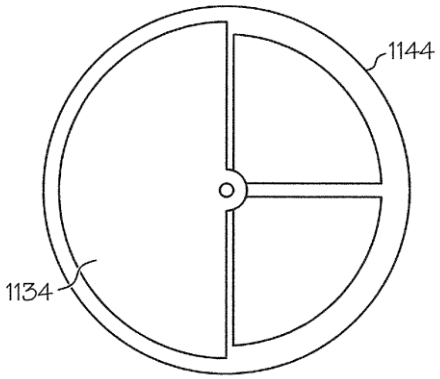

FIG. 13G

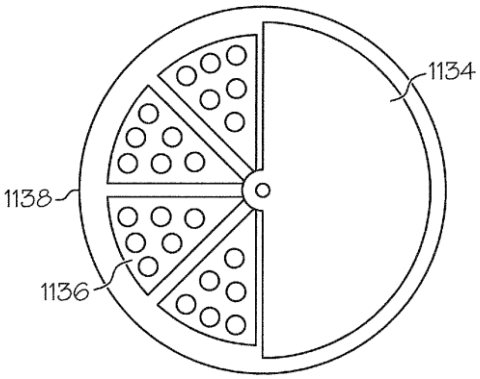

FIG. 13D

My employment with the company that holds these patents ended 2010, and was surprised today to see they were granted a patent on certain aspects of the device in 2018. I think the device would be useful in treatment of COVID-19, especially the L-type presentation. I guess interested parties could contact them at Phone: 888-925-2526 www.mergenetsolutions.com

[1] COVID-19 pneumonia: different respiratory treatment for different phenotypes?L.Gattinoni et al. https://www.esicm.org/wp-content/uploads/2020/04/684_author-proof.pdf

This paper is explained here https://www.youtube.com/watch?v=o8aG63yigjA