

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,

Petitioner,

v.

MASIMO CORPORATION,

Patent Owner.

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Case IPR2022-01299 & IPR2022-01300

U.S. Patent 7,761,127

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**DECLARATION OF MOHAMED DIAB**

1. I, Mohamed Diab, am making this declaration at the request of Patent Owner Masimo Corporation (“Masimo”) in the matters of the *Inter Partes* Review Nos. IPR2022-01299 and IPR2022-01300 of U.S. Patent No. 7,761,127 (“the ’127 patent”). I understand that Apple submitted the ’127 patent as Exhibit 1001 in these proceedings. The ’127 patent describes and claims the invention that came out of our development of a sensor capable of noninvasively measuring carboxyhemoglobin. I understand that this declaration is being submitted in each of these proceedings as Exhibit 2002.

2. I gave deposition and hearing testimony in an ITC Investigation in which Masimo asserts the ’127 patent and other patents against Apple. My testimony in this declaration is similar to my testimony in the ITC Investigation.

3. I started as an engineer at Masimo. My current position at Masimo is fellow scientist. I started working at Masimo in 1989 and have worked there ever since.

4. In 1986, I graduated from Cal State Fullerton with a Bachelor of Science degree in electrical engineering with an emphasis on computer engineering.

5. In the 1990s, I and the other engineers at Masimo were working on our first pulse oximeter. I was involved in the hardware design, the sensor design, and

the algorithm design. The algorithm takes the signal from the sensor and calculates pulse rate, oxygen saturation, and other parameters.

6. A pulse oximeter is a device that noninvasively measures physiological parameters in a patient's blood by transmitting light into a tissue site (such as a finger) and measuring the light after it has passed through the tissue. Figure 1 of the '127 patent depicts a pulse oximeter with a sensor attached to a patient's finger.

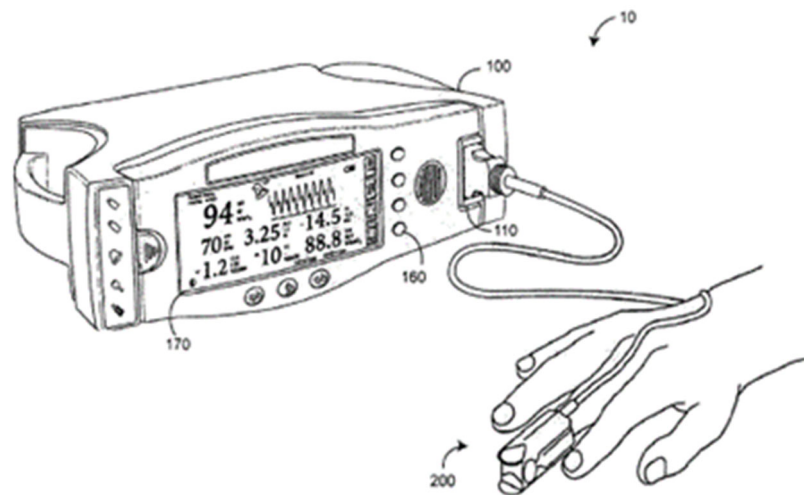


FIG. 1

7. In a typical pulse oximeter, the sensor that attaches to a patient's finger contains: (1) two light sources, generally light-emitting diodes (LEDs), and (2) a sensor with a light detector (generally a photodetector). Top and bottom views of a Masimo rainbow® sensor are shown below.



Top view



Bottom view

8. Oxygen saturation (“SpO<sub>2</sub>”) is a parameter measured noninvasively by pulse oximeters. For an oxygen-saturation measurement, the LEDs typically transmit red and infrared light into the patient’s finger. Some of the transmitted light is absorbed by the tissue and pulsating blood flow in the finger. Bright red oxygenated blood absorbs light differently than blue-green tinted deoxygenated blood. The light detector measures the intensity of the light (i.e., amplitude) from both wavelengths after it passes through the tissue. The ratio of the amplitude of the measured pulsating intensity of the light detected at the red wavelength compared to light detected at the infrared wavelength indicates the level of oxygen saturation. Therefore, for pulse oximetry, the amplitude of each signal is crucial. Assuring the amplitude of each signal is accurately processed is very different and much more difficult than detecting a pulse for pulse rate. For pulse rate detection, a device need have only one LED and measure the time it takes a signal to fluctuate over a cycle.

9. Masimo has become a leading innovator in pulse oximeters that measure oxygen saturation. I and other engineers at Masimo are inventors on hundreds of patents for oxygen-saturation measurement using pulse oximeters. For example, we were the first to develop pulse oximeters that could accurately measure oxygen saturation while a patient is moving.

10. Masimo's pulse-oximetry algorithms were already extremely accurate in measuring oxygen saturation before the '127 patent invention. In fact, Masimo's pulse oximeters do not use the invention claimed in the '127 patent to measure oxygen saturation.

11. In about 2001, we started a project at Masimo to work on noninvasively measuring carboxyhemoglobin and other parameters within the hemoglobin species. The parameters within the hemoglobin species include oxyhemoglobin (blood oxygen saturation), carboxyhemoglobin, methemoglobin, and total hemoglobin. These parameters are much more difficult to measure noninvasively than the parameters traditionally measured by pulse oximetry.

12. When carbon monoxide binds with hemoglobin, it displaces the oxygen and will not let the oxygen bind with hemoglobin for many hours to come. Thus, it turns the hemoglobin into a dysfunctional hemoglobin, causing carbon monoxide poisoning.

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