Stories of Science: Hedy Lamarr: The Mother of Wi-Fi

The story about how a great mind was constantly being silenced by society.

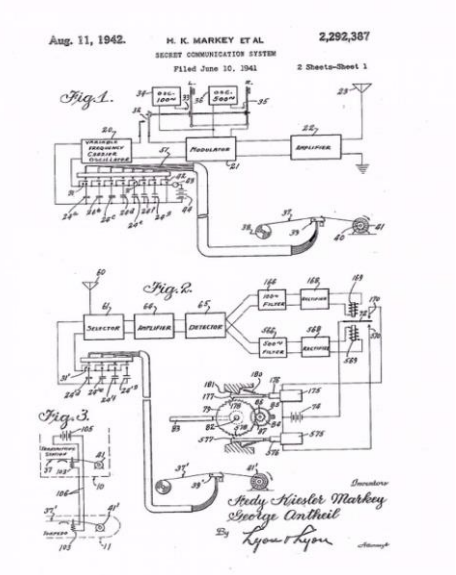

Figure 1: Hedy Lamarr

While we use Wi-Fi or Bluetooth on our phones and in our homes every day, hardly anyone would think of the name Hedy Lamarr. Hedy is one of the greatest inventors of the past 100 years, but she was more well known for her role as an actor than for her world-changing inventions. This is because society didn't want her to be a famous inventor.

A Brief History of Hedy

Hedy was born Hedwig Kiesler to Jewish parents in Vienna in 1914. As a child, Hedy's father constantly pushed her to question everything around her, to break things open to see how they worked and to put them back together again. Her mother was into the arts and would encourage Hedy to take ballet and piano lessons. As Hedy grew up, people were only interested in her beauty; she would eventually be known as "the most beautiful woman in the world". Hedy was headhunted at 16 to appear in a movie. She became a successful actor, and was soon married to Friedrich Mandl in 1933. She would often overhear conversations Mandl had with Nazi party associates and Hedy picked up lots of information about engineering and inventing. However, Hedy was constantly treated "like a doll" by her husband and friends and was very unhappy in her marriage. She eventually fled her first marriage on a bicycle.

The Start of Hedy the Inventor

After moving to Hollywood to become a famous movie star, she became friends with aviation tycoon, Howard Hughes. Howard would give Hedy equipment to work on in her trailer, during her spare time while filming movies. Hedy bought books on birds and fish to help her understand how to make Howard's planes more streamlined so that he could sell them to the US military.

Frequency hopping

In 1941, during the Second World War, Hedy worked on a very important piece of technology that wouldn't be recognised until many years later. She came up with the idea of frequency hopping, where radio signals would hop between one frequency to another. These radio signals could guide missiles, and because the frequency would change, it would make it more difficult for the enemy to detect the missiles. Hedy and her friend (composer and pianist, George Antheil) worked on the patent for frequency hopping; however the technology was rejected by the US navy. Hedy was told that she would make a better contribution to the war efforts as a pinup model, entertaining the troops rather than working on inventions. The frequency hopping technology was not used until more recent applications, such as Wi-Fi and Bluetooth. The transmitter of the signal constantly changes the frequency that it is being broadcast at, thus avoiding the problem of a communication failing at a specific frequency.

Figure 2: Hedy Lamarr's patent from 1942

After the War

Throughout her life, Hedy's intelligence was always underestimated. The public were only ever interested in Hedy the actor. The media only ever spoke of her acting career and not her scientific contributions. Hedy also invented better traffic light system and even a cola tablet that dissovled in water, but her work as an inventor was never made public. Nobody really knew of Hedy the inventor until close to her death in 2000, and she never received any money for any of her inventions.

Comprehension and Reflection Questions

1. Hedy Lamarr was constantly being told that she should not pursue her scientific interests. How does this make you feel?

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2. How did Hedy's upbringing affect her choices in life?

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3. How did Hedy's knowledge of birds and fish help her improve the design of aircraft?

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4. In what way was George Antheil's career linked to the patent that they worked on together?

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Extension Activities

Ideas for things to do next:

Identify three ways in which nature has been used in engineering.

Research other famous male or female actors that have also made scientific discoveries or have invented something.

Research the different roles that women had during World War 2.

Further Reading

Ideas for things to read next:

Read about Hedy Lamarr and frequency hopping here: https://www.scientificamerican.com/article/hedy-lamarr-not-just-a-pr/

Read about frequency hopping spread spectrum and its applications here: https://en.wikipedia.org/wiki/Frequency-hopping_spread_spectrum

Read about Bluetooth technology and frequency hopping here: http://large.stanford.edu/courses/2012/ph250/roth1/