



# Hedy Lamarr

## HIDDEN HERO OF HISTORY

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**Hedy Lamarr** was a famous MGM Hollywood film actress, producer and, off screen, a brilliant **inventor**.

Hedy Lamarr was born in Vienna, where her early film career included acting in a number of Austrian, German, and Czech films.

In 1937, she left Austria for Paris, and then London, where she met the head of MGM studio, Louis B. Mayer. He offered her a contract to begin her film career in Hollywood, kickstarting a 28 year journey on the silver screen. Over the course of her time in the industry, she made 30 films, both as an actress and a producer.

Ms. Lamarr was known by the public as the “most beautiful woman in the world” and was adored for her performances on screen. But in between takes, she could be found in her trailer conducting scientific experiments. Her interest in invention began at age 5, when she took apart a music box and reassembled it.

**Her scientific curiosity stayed with her for the rest of her life.**

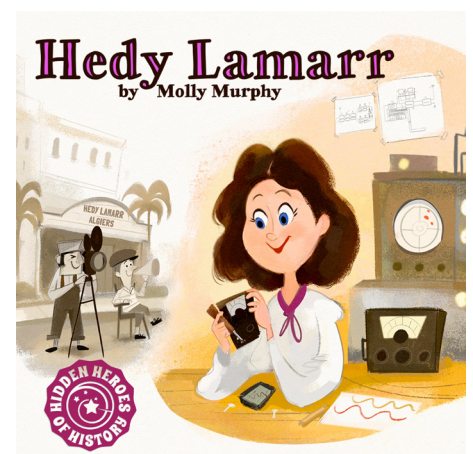
For example, she befriended famous inventor and film producer, Howard Hughes, who was known, in part, for his legacy in aviation. He built planes and flew them at great speeds. Ms. Lamarr noticed that his wing design was slowing his planes down. She studied books on birds and fish, and using nature as her guide, created a new wing design.

Mr. Hughes saw her talent and liked her gusto, so he put all of his scientists at her disposal to create her innovative wings. He called her “a genius” and readily adopted this new innovation for his aircraft.

**But Hedy Lamarr's most influential invention is one that still impacts our daily lives...**

World War II is in full swing and Ms. Lamarr wanted to contribute by volunteering her services to the **National Inventors Council**. The council turned her down and suggested that she use her celebrity status to sell war bonds instead.

The Council's rejection didn't stop Ms. Lamarr! She learned that the Navy used radio signals to launch their defenses. They sent those signals, on frequencies, using one channel which meant the frequencies could easily be jammed. Also, the radio signals could be discovered and translated, and the Navy's communications would be blocked.





Ms. Lamarr came up with a brilliant idea: **frequency-hopping**. This means that instead of all of those communications going on one, easily intercepted channel, they would hop around on many different channels. If one channel was jammed, it would only stop a second or two of the radio communications. The radio signals could not be intercepted, unless you knew the channels that were going to be used beforehand.

To come up with the technology, she worked with her friend, a piano composer by the name of George Antheil [Ant-hi-el]. They developed the idea and created a device that made the frequencies jump across 88 different channels—like the 88 keys on a piano.

They submitted their device to the **patent office** and were granted a **patent** on August 11, 1942, but the council thought the invention would be too difficult to be put into place for the war efforts. So, it took until the 1950s for engineers to begin taking the patent seriously. By the early 1960s, they completed the technology to finally implement frequency-hopping. We can thank Ms. Lamarr's technology for making our modern communications—like cell phones, Bluetooth devices, GPS, and wi-fi networks—possible.

Even though some of Ms. Lamarr's inventions weren't as successful as her frequency-hopping, her pioneering spirit never failed! She experimented with new ideas her entire life. She once said, "*Inventions are easy for me to do, I don't have to work on ideas, they come naturally.*"

And with that natural talent, Hedy Lamarr quietly, and with no fanfare, changed the world.

## **Hedy Lamarr's Inventions**

Here are only a few innovative ideas and inventions by Hedy Lamarr, who never stopped experimenting:

- Fluorescent glow-in-the-dark dog collar so owners could easily find their pups in the dark
- New airplane wing design to create faster planes
- Dissolvable "fizzy cubes" tablets to turn water into a sparkling drink
- Improved traffic stoplight design
- Frequency-hopping technology, the foundation of wi-fi, Bluetooth, GPS and cell phones

## Glossary

**Inventor** – the first person to create a new item, technology, or different way of doing something. Inventors are creative thinkers who look for ways to solve problems or enhance other ideas to improve peoples’ lives.

**National Inventors Council** was a United States government organization established in 1940 to discover inventions with possible military and national defense uses, and to bring them to the attention of the U.S. armed forces.

**Frequency-hopping** – A method that is used to rapidly switch transmitting radio signals among several frequency channels. Hedy Lamarr and George Antheil developed a form of frequency-hopping for secure communication.

**Patent** – A patent gives an inventor exclusive rights to their invention, which means that the invention cannot be commercially made, used, or sold by others without the patent owner’s consent.

**Patent Office** – A government body that may grant or reject a patent application according to whether it does or does not fulfil the patent requirements.

## Give it Some Thought

Hedy Lamarr was known as a famous Hollywood film star but had another true passion for experimenting and inventing. Why do you think people never knew, until now, that she was a scientist and technological innovator?

Why do you think that the National Inventors Council turned Hedy Lamarr’s offer to volunteer down?

Where do you think Hedy Lamarr found her inspiration for her inventions?

Why is “curiosity” an important trait for a scientist, engineer, or inventor?

## Use Your Imagination

It’s time to channel Hedy Lamarr’s curiosity, pioneering spirit and passion for experimentation by coming up with your own invention! Think about what you would like to create—is it a new item or different way of doing something? What problem are you solving or how are you improving on something that already exists? Once you have your idea, write down your answers to these questions:

1. What’s your invention’s name?
2. What’s the purpose of your invention?
3. How does your invention work?
4. How will it help others?
5. Draw a sketch of your invention!