

## Women's History Month: Women's Role in Patents

Women's History Month is celebrated in March of each year and presents a time to highlight the contributions of women in history. In view of Women's History Month, Jones Robb would like to discuss women's role in patents.

Throughout history, women have been responsible for a variety of groundbreaking innovations that received patent protection. For example, in 1966 Stephanie Kwolek obtained a patent for Kevlar, a strong but lightweight material that has many applications including bulletproof vests and building materials. Ann Tsukamoto is an inventor for a patent granted in 1991 for a process to isolate stem cells. In 1871, Margaret Knight received a patent for a machine to make paper bags, which are still used in households today. Ellen Ochoa was the first Hispanic-American woman in space and is an inventor on three patents for optical inspection and noise removal in images. In 1988, Patricia Bath was the first African American female doctor to receive a patent for a medical invention. She now has five patents directed to the treatment of cataracts. Other distinguished women inventors include Mary Anderson, who obtained a patent for a windshield wiper in 1903, and Joy Mangano, who obtained fame for her self-wringing *Miracle Mop*. Joy Mangano now holds more than 100 patents for her inventions, and the film *Joy* was loosely based on her life.

Gertrude Belle Elion was honored as being the first female inventor inducted into the National Inventors Hall of Fame for her work in the development of drugs to combat leukemia, septic shock, and tissue rejection in patients. She was inducted in 1991 and has obtained about 40 patents throughout her career. In 2018, three women were inducted into the National Inventors Hall of Fame: Sumita Mitra for her work in nanocomposite dental materials, Jacqueline Quinn for her work in emulsified zero-valent iron, and Mary Engle Pennington for her work in food preservation and storage.

Although women have made significant contributions as inventors in many important innovations, there is a significant and persistent disparity between the number of women inventors and the number of men inventors on patents granted in the U.S. Women are listed as inventors on a disproportionately lower number of patents than men. While the percentage of women listed on U.S. patents has doubled since 1980, as of 2016, women accounted for only 12% of inventors on granted U.S. patents.<sup>1</sup> This percentage does not reflect the overall participation rate of women in the science and engineering work force. In 2018, women made up about 28% of the total science and engineering work force in the U.S.<sup>2</sup> There are various factors that may explain this discrepancy. Some research suggests that female inventors face more difficulty than men when it comes to securing funding that can be critical to patenting and commercializing innovations.<sup>3</sup> Notably, companies founded solely by women received only 2.2%

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<sup>1</sup> See: <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf> (February 11, 2019) "Progress and Potential: A profile of women inventors on U.S. patents"

<sup>2</sup> See: <https://www.bls.gov/cps/cpsaat11.htm> (accessed March 6, 2019)

<sup>3</sup> See: <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf> (February 11, 2019) "Progress and Potential: A profile of women inventors on U.S. patents"

of all venture capital funding in 2018.<sup>4</sup> Woman-founded companies often times don't have the same funds available to them as companies founded by men, thus limiting their abilities to file and obtain patents.

The public sector currently outpaces the private sector when it comes to patents listing female inventors, and the rate of females as named inventors on patents to public organizations matches more closely with the overall participation rate of women in STEM fields. In the last decade, women were named as inventors on about 20% of patents granted to universities and hospitals and on about 15% of patents granted to public research organizations, while women were listed as inventors on only 12% of patents granted to private businesses.<sup>5</sup> Do private businesses offer less opportunities for women than public organizations? Because women have historically been under-represented in science and engineering dominated businesses, do women today not have the networks and contacts to navigate these fields in private businesses?

The disparity between the number of women and men inventors is also present on an international scale. Only about 30% of international patent applications filed via WIPO in 2017 included at least one women inventor.<sup>6</sup> The Republic of Korea had the smallest gender gap in 2017 with 50% of its international applications including at least women inventor.<sup>7</sup> China is not far behind with 48%.<sup>8</sup> Countries such as Germany and Japan had some of the greatest gender gaps, both countries having only about 20% of their international applications including women inventors.<sup>9</sup>

Many programs for young girls emphasize STEM education to encourage girls to pursue science and engineering fields. One important factor in the STEM programs is that young girls see women as role models in the science and engineering fields. The objective of these programs is to encourage women to enter these traditionally male-dominated disciplines. As more women see opportunities in the fields that are typically the source of innovation, we can be hopeful that the gap between the number of women and men inventors on granted patents will begin to narrow. After all, many policemen owe their lives to Stephanie Kwolek for the Kevlar in their bulletproof vests. Where would society be today without such innovative female inventors as Stephanie Kwolek? And just imagine where society can be if more women were to share their innovations through the patent system!

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<sup>4</sup> See: <https://techcrunch.com/2018/11/04/female-founders-have-brought-in-just-2-2-of-us-vc-this-year-yes-again/> (accessed March 6, 2019)

<sup>5</sup> See: <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf> (February 11, 2019) "Progress and Potential: A profile of women inventors on U.S. patents"

<sup>6</sup> See: [https://www.wipo.int/export/sites/www/pressroom/en/documents/pr\\_2018\\_817\\_annexes.pdf#annex1](https://www.wipo.int/export/sites/www/pressroom/en/documents/pr_2018_817_annexes.pdf#annex1) (accessed March 8, 2019)

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> *Id.*