

# How Things Get Invented





Jet Plane



Automobile



Pizza Cutter



Safety Pin

Most of the things we use were invented. Large things like automobiles and jet planes and small things like pizza cutters and safety pins all exist because someone had a good idea. But how do people get ideas for a new invention? How do they take their ideas and turn them into new and useful things? Here is the story of one invention.



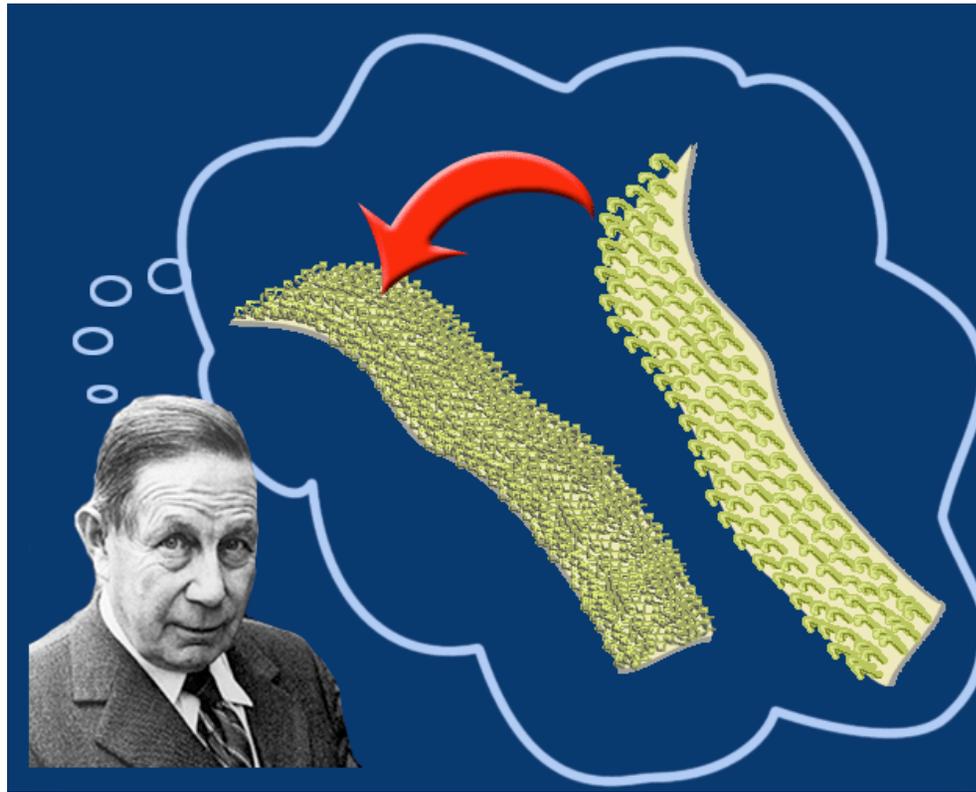
A man named *George de Mestral* lived in Switzerland. He was an engineer, and an amateur inventor. He also liked to climb mountains. In 1948, he took a vacation in the Jura mountains. One day he went game bird hunting in the woods with his dog, a pointer.



When he got home, he noticed that he and his dog were full of burrs. Burrs stuck to George's clothing and to the dog's hair. He had to pull hard to get the burrs off, and even had to cut some of the dog's hair to get the burrs loose. Most people would just pull off the burrs and throw them away. But George de Mestral was curious.



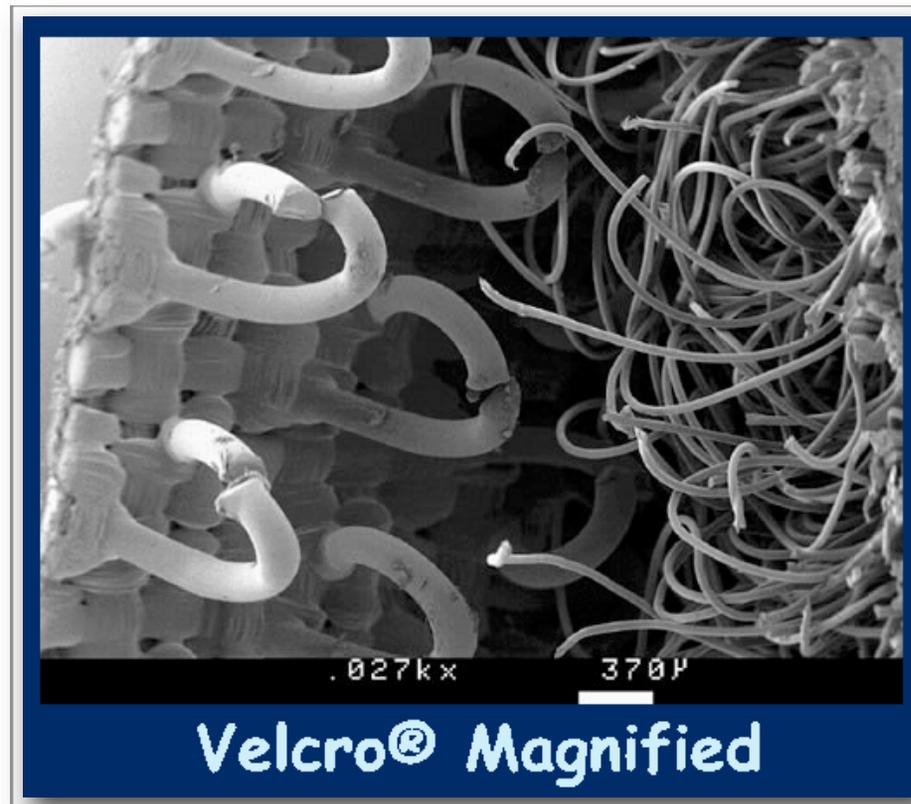
He wondered what made the burrs stick so tight, and decided to investigate. He used a microscope to see a burr up close. He could see that each spine on the burr had a little hook at the end. There were many little hooks on each burr, pointing in many directions. Once they tangled into something like hair or cloth, they could stick tightly.



Most people would have been satisfied with finding that out, and would have forgotten about burrs. But George had a wonderful imagination. He imagined being able to make strips of little hooks like he had seen on those burrs, and strips of looped threads for them to stick to. He realized that this would be a good way to fasten things together, and still be able to pull them apart.



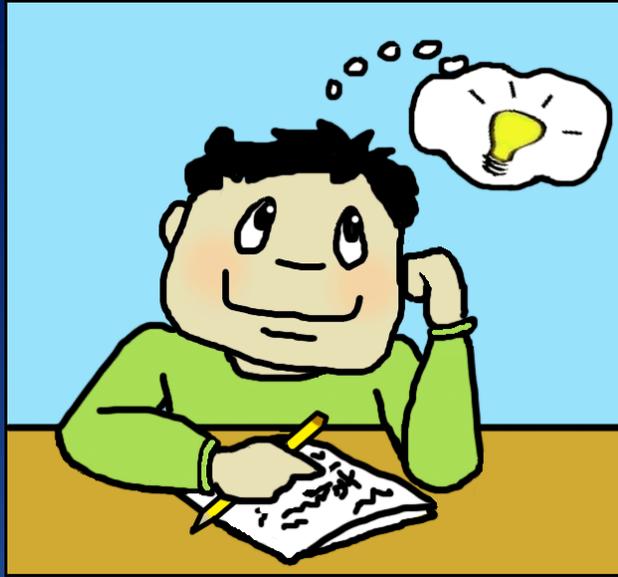
Many people laughed at George's idea. "We already have zippers and buttons," they said. "Who needs another fastener?" "It would never work," others said. But George didn't give up. He had perseverance. He began talking to weavers, to find a way to make tapes with the hooks and loops.



After many tries, he figured out how to make hooks and loops. He started a factory to make fastener tapes, which he called VELCRO®. Today we use strips of hook and loop tape to stick things up on a bulletin board, to put a strap around a bundle, to fasten shoes, even to hold the shoes of astronauts in place on the space station. George de Mestral's invention was a great success!



Could you be a successful inventor like George de Mestral? Are you curious about how things work? When you see something strange, do you take a closer look? Have you ever imagined something, or made up a story? Do you have perseverance? Have you ever tried something many times, and kept on trying until you did it? Then you have what it takes to be an inventor!



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## Sources and Credits

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Photos by Ann Brundige. Art work is original by Ann Brundige, with the following exceptions:

1. Photo of George de Mestral by Francoise and Charles de Mestral, from an article on his death. <http://www.aps.org/publications/apsnews/200402/history.cfm>
2. Magnified velcro is a scanning EM photo by Jim Ekstrom. <http://science.exeter.edu/jekstrom/SEM/SEM.html>
3. Pizza cutter and safety pin were adapted from images from Wikimedia, <http://commons.wikimedia.org/wiki/Image:PizzaCutter.JPG> and [http://upload.wikimedia.org/wikipedia/commons/thumb/4/4d/Safety\\_Pin.jpg/800px-Safety\\_Pin.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/4/4d/Safety_Pin.jpg/800px-Safety_Pin.jpg)
4. Clip art of automobile and jet plane from Clicker 5 picture library.

I used the following references:

1. The Invention of VELCRO® - George de Mestral By Mary Bellis <http://inventors.about.com/library/weekly/aa091297.htm>
2. Brief Timeline <http://www.hookandloop.com/extra/inventionnew.html>
3. Article on various burs <http://waynesword.palomar.edu/plapr98.htm#velcro>

Note that there is some variation in the date given for George de Mestral's walk in the woods. I chose to use the one from the article on his death, which was from a professional publication. Similarly, the date of his patent varies, but in this case the confusion seems to be between the first patent, in Switzerland, and the later U. S. patent, in 1955.

Some good links for student follow-up projects are:

- [http://inventors.about.com/od/famousinventors/Famous\\_Inventors\\_Nationality\\_or\\_A\\_Z.htm](http://inventors.about.com/od/famousinventors/Famous_Inventors_Nationality_or_A_Z.htm)  
[http://inventors.about.com/od/articlesandresources/a/great\\_thinkers\\_4.htm](http://inventors.about.com/od/articlesandresources/a/great_thinkers_4.htm) Minority inventors